Individual Investors' Housing Income and Interest Rates Fluctuations*

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Abstract

We study the relationship between the level of interest rates and the share of individuals who own rental properties. Using unique tax filing data from Australia, we show that declines in interest rates over the period between 2006 and 2019 have coincided with a substantial increase in the share of landlords, in particular among middle-income retirement-age individuals. We use both empirical tests and a survey of Australian landlords of our own design to explore different mechanisms, and find evidence consistent with *reaching for income*. Retirees have a preference for income-paying assets. As rates decline, they substitute interest income with rental income. This reaching for income behavior has aggregate effects on the homeownership rate, and on the exposure of retirees' income streams to local shocks.

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1 Introduction

A growing literature explores the role of institutional and professional investors in housing markets. However, relatively little is known about individual (non-institutional) investors in rental properties. This is in spite of the fact that rental properties are a popular form of investment for households in many countries.[1] An interesting aspect that sets rental properties apart from other investments is that a substantial fraction of asset returns is paid through rental yields, in the form of periodic rent payments (Demers and Eisfeldt, 2021). Money is fungible, and in general we would not expect investors to prefer yields (income) over capital gains. However, previous research has shown that certain investor groups favor income payments (see, e.g. Graham and Kumar, 2006 and Di Maggio, Kermani, and Majlesi, 2020), because of frictions and costs that limit the ability to consume capital gains, or because of behavioral biases.

In this paper, we provide novel evidence on the role of rental properties as an investment asset for households. In particular, we document that the fraction of retirees who are landlords increases substantially in an environment with falling interest rates. We use tax filings data and survey evidence to show that this effect is driven by the fact that retirees favor assets that provide compensation through periodic income payments. When money market rates and bond yields decline, retirees shift their portfolios towards rental properties. We then show that this *reaching for income* (Daniel, Garlappi, and Xiao, 2021) channel has important aggregate implications. It impacts homeownership rates, and increases the exposure of retirees' income streams to local economic shocks.

The context of our study is Australia, which is in many respects a more suitable setting than the United States. Like the United States and other major industrial and developed countries, Australia has experienced a substantial decline in interest rates between 2006 and 2019. However, unlike the United States,[2] Australia has not experienced at the same time a

[1] Total households' wealth invested in non-owner-occupied properties is larger than investments in financial assets outside of retirement plans, and is approximately equal to one quarter of the wealth held in retirement and insurance plans (Badarinza, Campbell, and Ramadorai, 2016).

[2] But along the same lines as other countries, such as Canada, Germany, and Chile.

housing bust. House price growth in the country has been largely unaffected by the Great Recession (see Figure 1), and thus interest rates drops have not been influenced by a local housing crisis.

Another advantage of Australia is that individual tax filings offer detailed information on rental income. In Australia, income losses from directly owned real estate properties can be subtracted from taxable income. Thus, most individual investors directly own rental properties and report both their rental income and expenses. In the United States, even small investors frequently own their real estate investments through a legal entity, which makes the measurement of rental income challenging.[3] In addition, there is no joint tax filing in Australia, and our data contain details on individuals' demographics and locations of residence, which can be used to study the share of landlords across different segments of the population.

As a first step, we establish some key empirical facts. From 2017 to 2019—the last three years of our sample— the fraction of landlords is highest for middle-age (40 to 59) and retirement-age (60 and older) individuals in the top quintile of income in each age group. However, even among retirement-age individuals with median income, investment in rental properties is quite common: 20% own rental properties, with average annual gross rental income of AUD 17,000.

Most importantly, we find that the share of landlords has increased substantially over time. From 2002, the first year in our sample, to 2019, the fraction of individuals who are landlords has increased, in relative terms, by 30% (from 13% to 17%). Retirement-age individuals with median income within their age group have the largest increase in the share of landlords, equal to 80% in relative terms (9% in absolute terms). Most of this increase has taken place between 2009 and 2014, with a pattern that is negatively correlated with the path of interest rates on money market accounts and of bond yields (see Figure 1).

We then turn to disentangling the competing economic mechanisms that could explain these time-series patterns. The fact that middle-income retirees responded more strongly than all

[3]While also in the United States it is possible to deduct rental losses from ordinary income, there are substantial restrictions, which exclude the more affluent landlords, or those with multiple properties. The deduction can be taken only if taxable income is below $100,000, and cannot exceed $25,000.

other groups is consistent with *reaching for income*, which takes place if capital gains and investment income are not considered fungible (Daniel, Garlappi, and Xiao, 2021). As mentioned above, this could be because of frictions, because of the attention costs involved in progressively liquidating capital gains, or because of bequest or behavioral motives that make investors unwilling to liquidate their asset portfolios.

Retirement-age individuals are the most reliant on investment income, since they typically have higher wealth, but lower earnings than the younger groups. This is particularly the case for middle-income retirees, since high-income retirees in the data have substantial earnings from private businesses and trusts. The decline in interest rates reduces investment income from money market accounts, and from roll-overs of bond investments. Retirees who are reaching for income respond by seeking other assets that offer high-yields in the new low-rates environment. Rental properties are among these assets, and are particularly attractive because they offer high yields and recurring payments. Thus, through reaching for income, a drop in interest rates can lead to an increase in the share of landlords among retirees.

We use multiple empirical tests and a survey of our own design to address the concern that the relation between interest rates and the share of landlords may be driven by other channels. In particular, we consider three main sets of alternative mechanisms. First, the period of interest rate cuts is also a period of sustained growth in house prices. Our results could be explained by investors responding to price growth. Increases in house prices may change long-term house price growth beliefs (Agarwal, Hu, and Huang, 2016, Armona, Fuster, and Zafar, 2019, and Kuchler and Zafar, 2019).[4] Even if there are no effects on beliefs, price appreciation may increase investment because it has effects on individual wealth and collateral constraints. Higher prices for primary residences increase individuals' wealth. This in turn relaxes borrowing constraints[5] or increases the willingness to invest in risky assets because of

[4]Over-extrapolation from recent price trends has been a driver of speculative investment in the United States before the Great Recession (Chinco and Mayer, 2016, and Bayer et al., 2020).

[5]For instance, Gargano, Giacoletti, and Jarnecic (2022) show that, by relaxing borrowing constraints, local price growth plays an important role in shaping buyers' search behavior.

wealth effects (see for example Chetty, Sandor, and Szeidl, 2017).

Second, cuts in interest rates may coincide with declines in credit spreads, and laxer mortgage underwriting standards. Lower cost of debt and easier credit may then stimulate investors' activity in the housing market (Haughwout et al., 2011).

Finally, investors might be *reaching for yield*. This mechanism is closely related to reaching for income, and consists of increasing allocations to risky assets when the risk-free rate declines, to maintain the expected rate of return on the investor's portfolio unchanged.[6]

Note that the alternative mechanisms described above do not predict that the largest increase in the share of landlords should take place among retirees. If the effects were driven by over-extrapolation of price growth, the patterns in the data could be matched only if retirement-age individuals were the most prone to over-extrapolation. This is not consistent with the results in Armona, Fuster, and Zafar (2019), who show that young individuals extrapolate the most. If the effects were instead driven by the relaxation of credit constraints, we would expect the largest increase in the share of landlords among young or middle-age individuals, who have on average lower wealth and are more likely to be constrained. Finally, while reaching for yield can explain an increase in real estate investments (Korevaar, 2021), the fact that retirement-age individuals drive our results, combined with the additional empirical evidence we discuss below, points to the fact that individual investors in our data are specifically seeking real estate income, rather than just higher returns.

In the data, we first estimate at the postcode level the association between the evolution of the share of local residents who are landlords and the level of interest rates, measured using the rate on the 6-month Australian certificates of deposit, the 2-year Australian government bond yield, and the 10-year Australian government bond yield. We include postcode fixed effects, and control for concurring fluctuations in stock market returns, mortgage spreads, and local house price growth. We find that a 1% lower level of rates is associated with an increase in the

[6] Hau and Lai (2016) and Lian, Ma, and Wang (2019) document that this behavior leads retail investors to shift asset allocations from bonds to stocks when interest rates decline. Korevaar (2021) shows reaching for yield effects in real estate, using historical evidence from the 18th century.

fraction of landlords of 0.6-0.9%. Interestingly, the fraction of landlords is negatively related to house price growth in the postcode of residence. This is at odds with the predictions of the house price growth channel discussed above, which would instead predict a positive relation. Moreover, the coefficient for the relation between the share of landlords and the mortgage rate spread over the 10-year government bond yield is not statistically significant.

We then use sales and listings data available from Corelogic to construct measures of local housing investment by small landlords. We define a purchase with the aim of re-listing the property for rent as a "buy-to-let" transaction. In the data, we identify a "buy-to-let" transaction as occurring when a house is re-listed for rental within 9-months after purchase. These transactions are most likely carried out by small landlords and small investors, since institutional investors focus on the development and acquisitions of large multifamily buildings, and sophisticated landlords likely acquire even small properties with the help of brokers or specialized agents (not through regular sales listings).

We estimate a regression specification similar to that used for the share of landlords, and show that at the postcode-level the annual volume of buy-to-let investment activity is strongly negatively associated with the level of interest rates. One may think that this association could be explained by the fact that lower rates stimulate investment activity in general. To dispel this concern, we construct a placebo test. If the association between buy-to-let volume and rates was indeed just driven by an increase in investments, we would also expect to observe an increase in speculative trading. We use the listing data to identify buy-to-resell transactions (house flips), defined as properties re-listed for sale within 9-months of purchase.[7] We find that this measure of speculative trading activity is weakly related to the level of interest rates, and that lower rates are associated with a *lower* volume of buy-to-resell transactions.

Having established that the relation between rates and the volume of housing investments is specific to buy-to-let transactions, we construct high-frequency measures of buy-to-let activity,

[7]While houses might be resold quickly also because of unforeseen circumstances or life-changing events, previous research has shown that the volume of resales with holding period shorter than one year is a good proxy for speculative investment volume (Bayer et al., 2020).

and study fluctuations in buy-to-let volume around monetary policy announcement dates. Using an approach similar to the local projections method in Jorda (2005), we find that negative surprise changes in bond yields around announcement dates are associated with an increase in the volume of buy-to-let transactions in the following six months.

The results discussed so far focus on the time-series dimension on the data. As a further step in our analysis, we explore cross-sectional differences across geographies. We estimate regression equations with postcode-by-year fixed effects, and focus on the coefficients of interaction terms between rate levels and postcode characteristics.

We show that the increase in the fraction of local landlords is larger in postcodes that in 2005 had a higher fraction of retirement-age and middle-age residents, who would have reached retirement-age during the time period of our study. This local-level evidence based on lagged demographic variables attenuates the concern that our results might be driven by an influx of elderly residents in certain postcodes during the period of interest rate cuts. We also show that the increase in the volume of buy-to-let investments in response to lower rates is largest for properties located in postcodes that have historically offered higher rental yields, measured as average yields between 2000 and 2005. The fact that rental investors are more likely to purchase in areas that offer high income payments is consistent with reaching for income.

We then turn to individual tax records, and show that retirement-age landlords are the group that is most likely to extract positive net income (rent net of interest, capital, and other expenses) from rental properties. Moreover, retirement-age landlords have little leverage (the majority of these landlords have no mortgage interest expenses), and thus are not taking advantage of lower credit spreads or laxer underwriting standards. Finally, we show that, as rates decline, retirement-age individuals substitute income from interest rates payments with real estate income. All these results are consistent with elderly investors reaching for income using rental properties.

In addition to the empirical evidence from observational data, we also develop and deploy a survey with the help of the Australian Landlords Association (ALA). The survey is targeted at

Australian residents who own rental properties as individual small landlords. We use a standard set of financial literacy questions to assess that the respondents understand basic financial concepts. Moreover, we collect information on when a landlord purchased her property, the landlord's age, and other demographic characteristics. We use this information to identify those who purchased during the period of declining interest rates (between 2006 and 2019), and to study differences across age groups. Most crucially, we ask respondents about their motivation for investing in rental properties at the time of purchase. We ask both an open question, and a question in which respondents can assign scores to different motives. We use this second format to run a horse race among the different channels discussed above: the desire to earn investment income, the desire to realize capital gains, access to larger home equity in the primary residence due to higher prices, low mortgage rates, and so on.

Landlords who are retirees rank the desire to earn income higher than any other motive, including the desire to realize capital gains. This result is not limited to the "close-ended" scoring questions, but is also confirmed by text analysis of the answers to the open question. Crucially, retiree landlords assign higher scores to rental income than non-retirees, who instead favor capital gains. This is consistent with our argument that the increase in the share of landlords among retirees is strongly suggestive of an income motive. Landlords who are not retirees also appear more interested than retirees in taking advantage of income losses as tax shields (negative gearing), and more influenced by low mortgage rates. Finally, both retirees and non-retirees agree that rental real estate is a safe investment asset. Thus, the decision to invest in rentals is not driven by risk-taking in response to wealth effects (asset prices appreciation) due to higher asset prices.

In the last part of the paper we turn to the aggregate implications of the increase in the share of landlords among retirees. First, we focus on the effects on the homeownership rate. If new landlords are mainly purchasing their properties from institutional investors, from other small landlords with multiple properties, or from developers, the increase in the fraction of landlords may have limited effects on the fraction of owner-occupied homes. However, we instead find

a strong association, at the postcode-level, between the increase in the volume of buy-to-let transactions and drops in the homeownership rate. Moreover, we find that the respondents in our survey are more likely to have purchased their property from an owner-occupier rather than from another landlord or from a developer (new construction). Finally, we show that declines in interest rates have been associated with a higher likelihood that buy-to-let properties are purchased from owner-occupiers. Combined, these findings suggest that the declines in interest rates, by increasing rental property purchases by retirees, have likely had a negative impact on the homeownership rate in Australia.

Second, we study the effects of the increase in the share of landlords on income risk, in particular for retirees. To this end, we study differences in exposure to local economic shocks for landlords and non-landlords. We focus on Western Australia, where local economic conditions are heavily dependent on iron ore price fluctuations, which are in turn driven by foreign demand. We show that the income of retirement-age landlords is strongly exposed to commodity price shocks, while the income of non-landlords in retirement age has no significant exposure. Thus, an increase in the fraction of landlords largely increases exposure of retirees' income to local economic shocks.

We contribute to the literature that studies how declines in interest rates trigger portfolio reallocation towards assets with higher expected returns, or higher income yields (Hau and Lai, 2016, Lian, Ma, and Wang, 2019, Jiang and Sun, 2019, Daniel, Garlappi, and Xiao, 2021, and Korevaar, 2021). Daniel, Garlappi, and Xiao (2021) provide evidence of reaching for income behavior in financial markets, showing that retirement-age individuals respond to rate declines by increasing investments in high-dividend yield stock funds. We provide novel evidence for real estate. Housing produces, in general, higher income yields than most segments of the stock market. However, direct investment in real estate is lumpy and illiquid. Thus, it is perhaps surprising that the desire for income leads some investors to choose this asset class. Moreover, the implications of a higher share of small landlords for the housing market and for income risk are potentially far-fledged, and interesting in their own regard. Korevaar (2021) uses data from

the 18th century Netherlands to present evidence of capital flows away from (into) government bonds and into (away from) real estate in response to rate declines (increases). We provide a complementary contribution, showing that fluctuations in interest rates, even today, with developed financial markets, have an impact on housing investments. Moreover, thanks to the granularity of our data, we are able to disentangle the specific role of the reaching for income channel and of retirees.

Our study also contributes to the literature on investors in the housing market. Most of the literature has focused on house-flipping (see Chinco and Mayer, 2016, Badarinza and Ramadorai, 2018, Bayer et al., 2020, Favilukis and Van Nieuwerburgh, 2021, and Deng et al., 2021). Our analysis is instead more closely related to studies of long-term housing investors (Garriga, Gete, and Tsouderou, 2021, Gurun et al., 2022, and te Kaat, Ma, and Rebucci, 2021). The findings are novel, since we focus specifically on individual investors, and on the reaching for income channel. Finally, we contribute to a growing literature studying income composition across households, and how this is affected by interest rates changes and monetary policy.[8]

The rest of the paper proceeds as follows. Section 2 describes the data used in our study and presents summary statistics. Section 3 discusses the key stylized facts at the core of our analysis, and discussed mechanisms and interpretation. Section 4 provides several tests using observational data to disentangle competing mechanisms. Section 5 presents survey design and results. The effects on homeownership rates and income dynamics are in Section 6. Finally, Section 7 contains our concluding remarks.

[8]Kuhn, Schularick, and Steins (2020) and Smith, Zidar, and Zwick (2020) highlight the role of business income while Fagereng et al. (2021) focuses on heterogeneity driven by financial income.Coibion et al. (2017) show that expansionary monetary policy systematically decreases heterogeneity in total income, while Peydro et al. (2021) show that the gains from a lower monetary policy rate are increasing monotonically over the income distribution.

2 Data and Summary Statistics

In this section, we present the data at the center of our analysis. To study the share of landlords, landlord characteristics, and rental income, as well as the evolution of these variables over time, we gain access to detailed tax filing data for a broad cross-section of the population. We complement these data with rich information on individual house listings and transactions for the sales and rentals market.

2.1 Postcode-Level and Individual Tax Data

We use information from two separate datasets covering Australian tax filings. First, we use postcode-level data tracking individuals' taxable income and its components over the fiscal years ending from June 2002 to June 2019 (the Australian fiscal year starts on July 1st and ends on June 30th). The dataset covers the entire population and, for each income component, contains information on aggregate postcode income and on the number of individuals in the postcode declaring income (or losses) for that component. This allows us to track net rental income, and the share of individuals with rental income (or losses) residing in each postcode over time.

The second dataset is an anonymized representative sample of individual tax returns. The sample is a repeated cross-section for the fiscal years ending from June 2003 to June 2019, and covers approximately 2% of Australian taxpayers.[9] Note that the Australian system does not allow for joint filing, so all tax returns are individual. The data contain the single line items in each tax return, pertaining to both non-investment income (salary and wages, pensions, business income), investment income (interest income, dividend income, Australian real estate rental income, foreign investment income, and other sources), and capital gains. Table 1 displays summary statistics, in terms of 2019 Australian Dollars.[10]

[9] The total number of taxpayers per year over our sample period ranges between 10 and 14.7 million.

[10] Inflation adjustments are based on the Consumer Price Inflation index published by the Royal Bank of Australia, available at https://www.rba.gov.au/inflation/measures-cpi.html

The individual tax filings provide highly detailed information on real estate rental income, which is the focus of our study. Only net real estate income is taxed, and negative rental income is considered a loss, and deducted from other income sources for tax purposes. Landlords report the gross rental income collected over the year, along with all deductible expenses. These are interest expenses, capital investments, and other expenses. Other expenses also include non-cash expenses, such as depreciation, while interest expenses are a good proxy for debt services since many loans issued to real estate investors by Australian banks are interest-only (with adjustable interest rates).[11] Some of these details are also available in the postcode-level data, but only after 2011.

We also have access to information on tax filer demographics: age,[12] gender, partner status, location of residence,[13] and occupation.[14] Figure A.1 in the Appendix displays the distribution of these characteristics in our sample, while Figure A.2 displays the age distribution across deciles of taxable income.

A challenge that we face when analyzing the tax filing data is that income reporting might be plagued by misreporting (understatement of income and overstatement of deductions). However, we believe this is likely a minor concern in Australia. Tax fraud is punished harshly, with administrative fees and penalties for serious offenses equal to 75% of the payment shortfall or evasion. Tax evasion can also be punished with jail sentences, with a maximum of 10 years. Moreover, for each fiscal year, the ATO reports statistics on the tax gap,[15] which is the dif-

[11] In the case of co-ownership, gross rents and expenses are split across co-owners, and each co-owner reports on her return only the fraction of income and expenses that are of her competence.

[12] Individuals are grouped into 11 age categories: 70 and over, from 65 to 69, from 60 to 64, from 55 to 59, from 50 to 54, from 45 to 49, from 40 to 44, from 35 to 39, from 30 to 34, from 25 to 29 and from 20 to 24. We remove from the sample individuals under 20 years of age.

[13] The location of residence is reported at the level of 33 macro-areas. For the most populated states (New South Wales, Victoria, Queensland, South Australia, Western Australia, and Tasmania), we can observe if the individual lives in the capital city, in a high urbanization area, in a low urbanization area, in other urban areas, or in a rural area.

[14] Occupations are divided into 9 categories, based on the first digit of the Australian and New Zealand Standard Classification of Occupations (ANZSCO): managers, professionals, technicians and trades workers, community and personal service workers, clerical and administrative workers, sales workers, machinery operators and drivers, laborers, and consultants and apprentices.

[15] The data are available at this link: https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Inividuals-not-in-business-income-tax-gap/

ference between the amount collected, and an estimate of what should have been collected if taxpayers were fully compliant with the law (this inference is based on misreporting detections and other ATO estimates). For salary income, dividends, interest payments, and rents the gap is on average only 5.6%.

2.2 Sales and Listing Data

We obtain micro-data on sales and rental listings from Corelogic. The data cover the two largest states, Victoria and New South Wales (located on the East Coast), and the largest state on the West Coast, Western Australia. Jointly, these markets account for the majority of sales and rental listings in Australia. The data span the period from January 2005 to December 2019, and include unique property identifiers, the postcode in which each property is located, property size, number of bedrooms, bathrooms, and car spaces. For both sales and rental listings, we observe the initial listing date, the original listing price, and each successive change in the listing price (along with the date on which each change took place). For sold properties, we observe the date and price of sale. Table A.1 displays summary statistics.

3 Stylized Facts and Competing Mechanisms

3.1 Housing Income and Landlord Demographics

As a first step, we explore differences in rental market participation across households groups based on age and total income. We choose these characteristics since they are strongly associated with lifetime income, wealth, and asset composition (Fagereng et al., 2021, Gomes, Haliassos, and Ramadorai, 2021).

In Figure 2, we use data on individual tax filings in 2017-2019 to split individuals into three age groups (25 to 39, young, 40 to 59, middle-age, and 60 and older, retirement-age), and income quintiles *within* age groups. Panel (a) shows the share of landlords in each sub-

group. We identify landlords as individuals earning any amount of gross income, or facing any expenses, from rental properties over the year. As we may expect, direct participation in the rental market is increasing in income and age. The fraction of landlords is lowest (below 5%) for young individuals with income below the median, and highest (above 35%) for middle and retirement-age individuals with income in the top quintile of their age group. However, participation in the rental market is relatively common even for individuals belonging to intermediate income quantiles. When considering middle-age and retirement-age individuals in the 50th and 60th income percentile of their age group, we find that the share of landlords is 17.5% and 20%, respectively.

Panel (b) displays the average rental income of landlords in each sub-group. It shows that middle and retirement-age individuals in the middle of the income distribution earn annual gross rental income of $15,000 and $18,000, respectively. Individuals belonging to the same age groups, but in the top quintile of income, earn $27,000 and $31,000.

Panels (c) and (d) of Figure 2 display the composition of total income, across income quintiles, for middle and retirement-age landlords. We focus on these age groups since they are those with the larger shares of landlords. Retirement-age landlords with median and below median income appear to be highly reliant on rental income. Around median income, rental income represents more than 50% of total income. In the bottom quintile of income, rental income is 80% of total income. On the other hand, for retirement-age landlords in the top quintile of income, rental income accounts only for 20% of total income. Indeed, individuals in this last group receive substantial income streams from businesses and investment trusts.

3.2 The Economic Environment

In the United States, the Great Recession and the following slow recovery coincided both with a sharp decline in interest rates and with large fluctuations in real estate prices, which experienced

a large boom-bust cycle.[16] Given the contemporaneous occurrence of rates cuts and a large housing bust, it is challenging to specifically link the behavior of real estate investors, either institutions or individuals, to fluctuations in interest rates.

In Australia, trends in real estate markets have been substantially less hectic before, during, and after the Great Recession. Nonetheless, largely in response to the situation in international markets, and to other long-term trends common across developed economies, interest rates have been steadily declining in Australia over the period from 2006 to 2019. Panel (a) of Figure 1 shows the evolution of the rate on 6-month certificates of deposit (CDs) issued by Australian banks, and 10-year bond yields for Australian government bonds, over the years from 2002 to 2019. The figure also shows the average residential rental yield across Australian postcodes.[17] The 6-month CDs rate declines from 7% in 2008 to 1% in 2019, and government bond yields follow a similar pattern. On the other hand, rental yields remain rather stable. We would like to stress again that this is in sharp contrast with what happened in the United States, where rental yields experienced massive fluctuations over the same time period (Piazzesi and Schneider, 2016).

Panel (b) shows the evolution of house prices in Australia, using both a country-level index, and indices for the two most populous states (New South Wales and Victoria). All indices are normalized to be equal to 100 in 2002. The Great Recession did not coincide with a decrease in house prices in Australia. The country-level index is 15% up in 2009 compared to 2006 levels (the Victoria index is 35% up), and more than 25% up in 2012 (the Victoria index is up 58%). In this sense, the Australian experience is similar to that of other major economies such as Canada in North America, Germany in Europe, and Chile in South America. However, the sustained increase in house prices may *per se* have induced an increase in participation in

[16] Previous work has shown how this cycle was amplified by changes in lending standards (see Mian and Sufi, 2011, Keys, Seru, and Vig, 2012, and Keys et al., 2013), and by highly pro-cyclical beliefs on the future evolution of house prices (see Case, Shiller, and Thomson, 2015 and Kaplan, Mitman, and Voilante, 2020), and how it generated several large government interventions (Agarwal et al., 2017 and Gabriel, Iacoviello, and Lutz, 2020).

[17] The rental yield is constructed as the ratio of the median (annualized) rent and the median price in the postcode, based on Corelogic postcode-level indices.

the rental market, either through optimistic beliefs or a home-equity accumulation channel. In Section 3.4, we discuss in detail these alternative explanations, and propose empirical tests to disentangle different mechanisms.

3.3 Time-Series Evolution of the Share of Landlords

Given the high frequency of landlords in 2017-2019, and the large fluctuations in interest rates and house prices, we turn to studying changes in the share of landlords over time.

Figure 3 shows changes in the share of landlords and in average rental income (for all individuals, including non-landlords), between the years from 2017 to 2019 and the years from 2003 to 2005, across income quintiles within different age groups. Differences across groups are remarkable. In relative terms, retirement-age individuals with income between the 20th and the 60th percentile see an increase in the share of landlords of 80% (roughly 9-10% in absolute terms). Average rental income for the same group (across both landlords and non-landlords) increases by 120%. Substantial increases are also present for middle-age individuals with middle-income, who have a relative increase in the share of landlords of 15% (2% in absolute terms), and increase rental income by 60%. The fraction of young landlords instead decreases, especially in the lowest income bracket (for which the drop is equal to 40%).

Overall, the changes in landlords' shares across demographic groups result in an increase in the combined share of landlords. In the years from 2002 to 2004, approximately 13% of Australian tax filers report income or expenses related to rental properties. This share is 17% in 2017-2019. This represents, in relative terms, a 30% increase. Figure A.3 in the Appendix depicts further evidence of this pattern in the aggregate time series and across geographies. Panel (a) shows that, while there is a small increase in the early 2000s, the share of landlords jumps in 2009-2010, and keeps gradually increasing between 2010 and 2014, when it is 3.5% larger than in 2002. Panel (b) shows the distribution of the share of landlords by postcode of residence, both in the years 2002-2004 and 2017-2019. Over time, the entire distribution shifts

to the right: the 25th percentile moves from 10% to 13.5%, the median moves from 13% to 16%, and the 75th percentile moves from 16% to 19%; 90% of postcodes experience an increase in the share of landlords. We also show in the Appendix that the increase in participation in the rental market across postcodes is not explained by mechanical effects, such as aging population, or the inflow of migrants.[18]

We explore age group-specific time-series patterns by estimating the regression equation:

$$y_i = \sum_{\tau=2005}^{2019} \delta_{\tau \times Young} \Big(I_\tau \times I_{20\ to\ 39} \Big) + \sum_{\tau=2005}^{2019} \delta_{\tau \times Mid} \Big(I_\tau \times I_{40\ to\ 59} \Big) + \sum_{\tau=2005}^{2019} \delta_{\tau \times Old} \Big(I_\tau \times I_{60+} \Big) + \alpha I_{20\ to\ 39} + \beta I_{40\ to\ 59} + \mathcal{B} X_i + \eta_l + e_i, \tag{1}$$

where y_i is either a dummy equal to one for landlords, or the log of individual rental income, I_τ is a fiscal year dummy, $I_{20\ to\ 39}$, $I_{40\ to\ 59}$, I_{60+} are age-group dummies and X_i is a vector of controls, including gender, partner status (married or single), and occupation category; η_l is a location fixed effect, based on the area of residence of individual i (see Section 2).

Figure 4 reports estimates of the parameters δ_t from equation (1). In the left panel, the dependent variable is a dummy equal to one if the individual is a landlord. The fraction of retirement-age landlords (age of 60 or above) – denoted by green squares – increases during the fiscal year ending in June 2009, and then further grows in the following years, reaching a maximum of 8% above the 2004 level in the last years of the sample. This is roughly a 60% relative increase, consistent with what shown in Figure 3. Changes are less stark for the middle-age group (red squares). However, we can still detect a clear increase in 2009, followed by a persistently higher participation level in the following years. The patterns for middle and retirement-age individuals mimic the time series evolution observed in the postcode-level data

[18] Figure A.4 in the Appendix shows that the postcode-level increase in participation from 2002-2004 to 2017-2019 has negligible association with the increase in the fraction of individuals of age 60 or older, and with the increase in the fraction of individuals who immigrated over the previous 5 years. These measures are constructed using postcode-level information from the Australian Bureau of Statistics, and by calculating percentage changes between 2006 and 2021.

in Figure A.3. The younger group (blue squares) sees a decrease in participation, first visible in 2009-2010, and then even larger in the last years of the sample.

These patterns are mirrored by the evolution of rental income over time across all individuals in each age group (including non-landlords), which are depicted in the right panel of Figure 4. In the last few years of the sample, rental income is almost 80% above its 2004 level for the retirement-age group, 30% above for the middle-age group, and 15% below for the young.

3.4 Competing Mechanisms

Several mechanisms can explain the negative association between the share of landlords and fluctuations in interest rates. The first mechanism we consider is *reaching for income*. Previous research indicates that investors close to or in retirement age, have a preference for high-income-generating assets (see e.g., Graham and Kumar, 2006 and Di Maggio, Kermani, and Majlesi, 2020), since they are most reliant on asset returns to fund consumption needs. Funding consumption with investment income rather than capital gains avoids the monetary and attention costs of regularly selling stock holdings, and may act as a self-control device because it does not require trading to liquidate assets.[19]

When rates are high, older investors can earn substantial income from money market accounts and bonds. However, a drop in rates may then create demand for other assets offering high income yields, in order to *reach for income*. Jiang and Sun (2019) and Daniel, Garlappi, and Xiao (2021) show that surprise rate cuts by monetary policy authorities result in an increase in demand for high-dividend stock funds among older investors and retirees.

The reaching for income channel appears to be a particularly compelling explanation for the stylized evidence in our study, since retirees are the group driving the increase in the share of landlords. As discussed in the previous sections, rental properties in Australia are high-income yield assets, and have provided nearly constant yields in a falling interest rates environment.

[19] Baker, Nagel, and Wurgler (2007) show that household consumption is significantly more responsive to dividend payouts than unrealized capital gains.

It is interesting that, in order to get access to these yields, individual investors are then willing to accept the frictions related to ownership of a highly illiquid and lumpy asset.

While reaching for income appears to be a compelling mechanism, there are several other alternative channels through which lower rates may stimulate investment in rentals. First, lower rates coincide with higher house prices. Investors' decision to purchase rental properties might have been driven by the sustained price growth over the years from 2002 to 2018, rather than by lower rates *per se*. This may be because expectations of future price growth are influenced by recent price growth, and investors purchase rental properties with speculative motives (Agarwal, Hu, and Huang, 2016, Chinco and Mayer, 2016, Armona, Fuster, and Zafar, 2019, and Bayer et al., 2020). It may also be because of the relaxation of investors' collateral constraints. Individual investors who are homeowners, and interested in purchasing smaller properties to lease out, may use their increasing home equity to fund new property purchases. Finally, higher house prices, and asset prices in general, may also generate wealth effects. Wealthier investors may be willing to take more risk in their portfolio, and increase the share of risky assets, including rental properties.

The second alternative channel is cost of debt. Real estate purchases typically involve the use of leverage. Changes in the level of interest rates determine changes in the cost of debt, and may also coincide with changes in credit spreads, mortgage underwriting standards, and lending constraints. To the extent that these effects ease borrowing for real estate investors, they may induce higher investment in rental properties.

Finally, individual investors may be *reaching for yield*. This channel is related to reaching for income, but it instead consists of shifting allocations towards higher risk, higher return assets when risk free rates decline.[20] Korevaar (2021) finds evidence consistent with reaching for yield in real estate using historical data from the 18th century. While this channel can

[20]In financial markets, Hau and Lai (2016) and Lian, Ma, and Wang (2019) document that households shift from bonds to stocks when interest rates decline. Becker and Ivashina (2015) and Di Maggio and Kacperczyk (2017) provide evidence of reaching for yield for institutional investors. For institutions, this behavior is driven by performance-related incentives, rather than biases.

explain higher investment in real estate in response to lower rates, in modern days reaching for yield can be achieved with a variety of financial assets, and does not predict stronger responses by retirees and older individuals.

In the following sections, we first propose several tests based on observational data and aimed at disentangling the competing mechanisms. We then present the results of a survey of our own design that directly investigates landlords' investment motives.

4 Tests of Competing Mechanisms: Observational Data

In this section, we present a battery of empirical tests aimed at disentangling competing economic mechanisms that may explain the relation between individuals' investments in rental properties and the level of interest rates. Section 4.1 provides evidence based on postcode-level information on the local share of landlords. Section 4.2 studies new investment activity in rentals, measured using properties quickly re-listed as rentals after purchase (buy-to-let). Section 4.3 exploits heterogeneity in postcode characteristics, and Sections 4.4 and 4.5 provide insights based on the individual tax filing data.

4.1 Rates and the Share of Landlords: Postcode-Level Evidence

We begin our analysis by estimating at the postcode level the association between rate levels and the fraction of tax filers who are landlords:

$$FracLL_{i,t} = \gamma y_t + \mathcal{B}X_{i,t} + \alpha_i + e_{i,t}, \tag{2}$$

where $FracLL_{i,t}$ is the share of landlords in postcode i at time t, y_t is a money-market rate or a bond yield in year t, α_i is a postcode fixed effect, and $X_{i,t}$ is a vector of controls that are meant to capture general market trends, and competing mechanisms. In particular, we include the postcode-level house (log) price growth, to account for channels directly tied to

house price fluctuations, and the mortgage rate spread (equal to the mortgage rate minus the 10-year government bond yield) to capture the real estate lending conditions channel. To also control for general financial markets and economic conditions, we include the average daily stock market return in year t, the dividend yield, and the Business Conditions Index published by the Australian Bureau of Statistics. To control for local housing demand and local demographic change, we also include postcode-level population growth. Standard errors are double-clustered by year and postcode.

Our estimates are reported in Table 2. In column 1, y_t is the rate on certificates of deposit (CDs) issued by Australian banks, in column 2 it is the yield of Australian 2-year government bonds, and in column 3 it is the yield of 10-year government bonds, respectively. The point estimates of the coefficient γ from equation 2 are negative across the board, and highly significant. A 1% decline in the 10-year bond yield is associated with a 0.9% increase in the fraction of landlords across postcodes.

Local house price growth has a significant coefficient, but its point estimate is negative. This is at odds with what predicted by the price growth channels described in the previous section. Beliefs/extrapolation, collateral constraints/home equity channel, and wealth effects all predict a positive sign. The coefficient on the mortgage spread is mostly insignificant, and the inclusion of this variable does not attenuate the slopes for yields. This suggests that credit spread fluctuations are unlikely to be an important confounding factor.

To make sure that our results are not driven by outliers, or areas with low population density, in Table A.2 of the Appendix we repeat the same analysis for a restricted sample of postcodes, which includes only urban and suburban areas. Point estimates are virtually identical to those reported in Table 2.

It is important to stress that estimates of the coefficient γ document an association, but not a causal relationship. Moreover, the evidence in the regressions described so far, while suggestive, is not enough to fully disentangle competing mechanisms. In the next sections, we implement further tests that are more directly aimed at ruling out specific channels, and at

making progress on identification.

4.2 New Investment Activity: Buy-to-Let

We propose in this section tests based on new investment activity patterns, which allow us to disentangle reaching for income, or, at least, motives that are specific to rental properties, from other channels. Extrapolative beliefs, the increase in home equity, the decrease in the cost of debt, or the relaxation of mortgage lending standards would stimulate both investment in rental properties and speculative housing investments (house flipping).

Thus, we use listings data available from Corelogic (see Section 2) to identify buy-to-let and buy-to-resell (house flipping) new investments. The former are defined as properties that are re-listed as a rental within 9 months of the date of purchase, while the latter are properties re-listed for sale within 9 months of purchase.

A shortcoming of the buy-to-resell measure is that it also captures quick turnarounds due to unexpected circumstances or life shock (such as death, or divorce). However, previous literature has shown that for holding periods shorter than a year, the volume of resales is in large part driven by speculative traders (see Bayer et al., 2020, who also use a 9-months cutoff for bought-to-resell decisions).

Figure 5 reports the time series of the volume of buy-to-let and buy-to-resell transactions. There is a large increase in the volume of buy-to-let transactions over the sample period of our study, with substantial increments in 2009 and in the years from 2011 to 2015. This path is consistent with the evidence in Figure A.3, which documents the increase in the share of landlords, and in Figure 1, which shows the two major drops in interest rates over the sample period. Interestingly, the same pattern is not present for the volume of buy-to-resell transactions. The number of these transactions remains roughly constant over the years included in our analysis.

To test the sensitivity of new investment activity to the level of interest rates, we estimate

regression specifications analogous to equation (2), but with dependent variable equal either to the share of buy-to-let (Panel A of Table 3), or the share of buy-to-resell (Panel B of Table 3) out of all house sales in a specific postcode and the year. We find negative and highly significant coefficients across the board for the association between buy-to-let activity and interest rates (either CD rate, or 2-year and 10-year bond yields). We instead find small and insignificant coefficients for the buy-to-resell activity.

Summing up, the results show that the decline in rates coincides with an increase in new investment activity in (purchases of) rental properties, but not with an increase in speculative trading activity. If the key channels driving our results were contemporaneous house price growth, or lower cost of debt and laxer underwriting standards, we would have expected a spike in investment activity for both rentals and speculation. On the other hand, if the channel is reaching for income, then the increase in investment activity has to be specific to rentals, as is the case in the data.

As in the previous section, we repeat the analysis for a limited sample of postcodes, restricted to urban and suburban areas. We report the results in Table A.3 in the Appendix. Estimates are aligned to those in Table 3.

Our analysis has so far been based on "low-frequency" relations, estimated with annual data. However, interest rates typically change multiple times within a year, especially around monetary policy (Kuttner, 2001) and macro news (Gurkaynak, Sack, and Swanson, 2005) announcements, which frequently follow a monthly schedule.

High-frequency tests are not possible with tax filings data, since they are available only at annual frequency. However, we can construct higher frequency series of buy-to-let decisions, along with monetary policy announcement dates, to provide tighter evidence on the association between the level of interest rates and the decision to invest in rental properties.

To this end, we use an approach similar to the local projections method in Jorda (2005),[21]

[21] Plagborg-Moller and Wolf (2021) and Jorda (2005) show that this approach is more robust to misspecification than impulse-responses.

and we estimate the response of the volume of buy-to-let properties to changes in rates taking place on monetary policy announcement dates.[22] More specifically, we estimate the following regression equation:

$$\Delta log(BuyToLet)_{t+h} = \alpha + \delta \Delta r_{t \to t-2} + \sum_{\ell=1}^{2} \gamma \Delta log(BuyToLet)_{t-\ell+1} + e_{t+h},$$

where $log(BuyToLet)_{t+h}$ is the log change in the volume of buy-to-let properties from month t to month $t+h$, and Δr denotes either the raw or the "surprise" change in rates. To compute surprises we follow Amberg et al. (2022), and calculate rate changes taking place around monetary policy announcements (between the two weeks before and the two weeks after rate announcements). The intuition is that already ahead of the meetings, fixed income markets would incorporate all forward looking information. Thus, changes in medium and long-term rates and yields that take place around policy announcements are likely to be determined by the market responses to surprise changes in policy rates or monetary policy guidance. These surprise can then be interpreted as "shocks" to the level of interest rates in the economy.

We display the results in Table 4. Panel A reports results for the change in policy rates, while Panels B and C report results for the "surprise" shocks to 2-year and 10-year bond yields. We find small responses for horizons from one to the three-months. This is not surprising, since housing is illiquid, and search time and the escrow process are likely to impose a lag between the decision to invest and actual transaction dates. Indeed, we find strongly significant negative relations between shocks and investment activity for longer horizons, starting from 6 months. A 1% decrease in rates leads to a 0.30% increase in the volume of buy-to-let properties.

4.3 Heterogeneity Across Locations

In this section we test prediction of the reaching for income channel, taking advantage of cross-sectional differences in postcode characteristics. First, reaching for income is more likely to drive

[22] Instead of estimating a large VAR we focus on the first equation which contains our variable of interest.

the investment decisions of individuals who are retired, or approaching retirement age. This is because these individuals are, or will soon be, the most reliant on financial income for their consumption needs. While this prediction is already corroborated by the facts documented in Section 3, we provide here further and better identified micro-level evidence. Second, if investors are reaching for income, they will be attracted by the assets offering the highest income yields. In our context, this means that investment activity in rentals shall increase the most in areas with high rental yields.

4.3.1 Location of Landlord Residence and Share of Seniors

To test the first prediction, we use postcode-level fiscal data, merged with information on local demographics as of 2005 (before the large declines in rates that took place starting from 2008). We then estimate the following regression equation:

$$FracLL_{i,t} = \gamma_{Senior} \left(y_t \times \phi_{Senior2005,i} \right) + \mathcal{B}_X X_{i,t} + \alpha_t + \alpha_i + u_{i,t}, \tag{3}$$

where $\phi_{Senior2005,i}$ is the fraction of households with a senior household head (of age greater or equal than 40) in 2005, before the beginning of the large interest rates declines in our period. While some of these residents are not yet retirees in 2005, they are going to become retirees, or get very close to retirement age, by 2019. Thus, $\phi_{Senior2005,i}$ is a proxy for retirement-age population over the period of our study, which is not plagued by endogenous moving patterns of retirees during rate cuts. The vector of controls $X_{i,t}$ contains time-varying postcode-level controls, consisting of postcode-level house price growth and population growth. Finally, α_i and α_t are families of postcode and year fixed effects, and y_t is one of the rates or yields introduced in the previous sections.

The coefficient γ_{Senior} captures the incremental effect of interest rate changes on the share of landlords in the postcode, depending on the predicted share of seniors based on 2005 demographics. If reaching for income is the mechanism at play in the data, the increase in the

fraction of landlords in response to a decline in rates should be stronger in areas that have larger fraction of seniors, and estimates of γ_{Senior} should be negative. This is the case in the data, as shown in columns 1, 2, and 3 of Table 5. A 10% higher predicted fraction of senior households in the postcodes translates into a 0.12%-0.16% higher sensitivity of the share of landlords for a 1% rate shock.

4.3.2 Location of Landlord Investment and Rental Yield

We then turn to testing the second prediction. If the effects in the data are driven by reaching for income, investment activity in rental properties should be higher in postcodes offering higher yields. We estimate the regression equation:

$$FracBuyToLet_{i,t} = \gamma_{RY} \left(y_t \times RY_{2005,i}\right) + \mathcal{B}_X X_{i,t} + \alpha_t + \alpha_i + e_{i,t}, \tag{4}$$

where $FracBuyToLet_{i,t}$ is, out of all properties purchased in year t and postcode i, the fraction that is re-listed as a rental within 9-months of purchase. The variable $RY_{2005,i}$ is the average rental yield for postcode i between 2000 and 2005 (before the period of interest rate declines), and all other variables are the same as in equation (3). Also in this case, the coefficient of interest is that for the interaction term, γ_{RY}, which captures differences in the response to rate changes across postcodes. The prediction of the reaching for income channel is that the coefficient should be negative. This is again consistent with what we find in the data, as shown in columns 4, 5, and 6 of Table 5. A 1% higher rental yield translates into a 0.5% higher sensitivity of the volume of new rental investments to a 1% change in rates.

4.4 Financing and Expenses

We now turn to the individual-level tax filings, which in addition to information on gross income from rental properties, also include related tax-deductible expenses. We use this data to test two basic predictions. First, if retirement-age individuals are reaching for income in real

estate, then they shall be earning positive income net of expense from their rental properties. Second, if retirement-age individuals were instead motivated by the low cost of debt or by lax underwriting standards, we should find that they are using substantial leverage to purchase their rental properties.

To test the first prediction, we construct two measures of net rental income using the micro-data from individual tax filings. The first measure subtracts from gross rental income both interest expenses and capital expenditures (capex). The second measure also subtracts "other" deductions, which include non-cash expenses such as depreciation. Panel a of Figure 6 shows, for the last three years of the sample, the fraction of individuals within each age group (retirement-age, middle-age, and young) who report positive net income after interest and capex (red bars) and after all expenses (blue bars). The differences across age groups are striking. Approximately 90% of retirement-age individuals earn positive positive income after interest and capex, and 65% earn positive income even after accounting for all expenses, including non-cash expenses. The same fractions are equal to 70% and 25% for landlords in the youngest age group. Thus, retirement age landlords are indeed more likely to extract income from their properties.

We then turn to testing the second prediction. Panel b of Figure 6 shows the distribution of interest expenses, as a fraction of total expenses, and across the three age groups. Approximately 50% of retirement-age landlords have no interest expenses, while for the median landlord in the middle-age and youngest group, interest expenses represent 50% of total expenses. Thus, retirement-age landlords have not taken advantage of lax credit market conditions to finance the purchase of rentals.

In panel c, we dig deeper into the analysis of expenses, by showing the fraction of total expenses driven by capex. We find that retirement-age individuals also have the lowest level of capital expenditures, with more than 60% of them reporting zero capex. While also a large fraction of middle-age and young landlords report no capex, overall capex is higher for these age groups. This evidence is consistent with retirement-age landlords being focused on rental

income extraction, rather than remodeling or capital improvements. Finally, in panel d of the figure we focus on the residual component, consisting of other expenses, including non-cash expenses such as depreciation. We find that this component is the most important for retirement-age individuals.

Summing up, retirement-age individuals are the most likely to extract positive net income for their properties, and appear to have the lowest leverage, in spite of the stark increase in rental market participation in their ranks, and to be the least likely to incur capex on their properties. All these results line up with the predictions of the reaching for income channel.

4.5 Changes in Individuals' Income Composition

Finally, we use the individual tax filings dataset to explore the evolution of individual income composition over time for different age groups. We re-estimate equation (1), with dependent variable equal to the fraction of income from interest-paying securities (top-left plot), dividends (top-right) and rents (bottom-left). We obtain our estimates using all individuals, including non-landlords and report estimates in Figure 7. Mechanically, within each age group and in each year the point estimates across the three panels of the figure must add up to one.

For the retirement-age group (green-squares), the relative contribution of rental income increases by roughly 10% between 2008 and the end of the sample. This increase coincides with a 10% decrease in the contribution of interest income, while the contribution of dividends is roughly unchanged. The pattern is strikingly consistent with the reaching for income mechanism. Retirement-age individuals have been shifting the composition of their financial income away from declining interest payments and into rental income flows.

The picture is more complex for middle-age individuals (red squares), who see an increase of roughly 2.5% in the contribution of rental income, a decrease in dividend income of roughly 12%, and an increase in the contribution of interest income of 10%. For the youngest group (blue squares), we find a 10% and 20% reduction for rental and dividend income, respectively, and a

30% increase in interest income. In Figure A.5 in the Appendix, we repeat the same analysis, but restricting the sample to landlords only. Due to strong growth in the Australian housing market, the contribution of rents to financial income has increased for all groups. However, the largest increase is for retirement-age landlords (10%) and the smallest is for the youngest landlords (3%). Retirement-age landlords also see the largest reduction in the contribution of income from interest-paying securities (-8%), while the youngest landlords see the smallest decrease (-1%). Interestingly, the contribution of dividend income falls by approximately 2% over the period of our study for all landlords.

While the evidence on the contribution of rents to total financial income for both young and middle age individuals line up with our previous results, the interpretation of the evidence for dividend and interest income is less clear-cut. It is possible that both young and middle-age individuals have shifted their financial portfolios towards high-growth stocks and other financial investments that pay low yields.

In any case, the decrease in dividend income for young and middle-age individuals, and the lack of changes for retirees, suggest that none of these groups has been systematically expanding allocations to real estate through Real Estate Investment Trusts (REITs): REITs typically pay high dividends. This is not surprising, since the Australian REITs market is still quite small. Even in recent years, REITs new assets acquisitions across all real estate asset classes have been limited to about AUD 30 Billion annually. Acquisitions from REITs specializing in multifamily and residential real estate have been just a small fraction of this total amount.

5 Tests of Competing Mechanisms: Survey Data

We complement the empirical evidence from observational data with a survey of our own design, in which we ask small individual landlords about the motives for their decision to purchase a rental property. Surveys can be used to explicitly pin down the drivers of individual behavior, and are increasingly used in finance research to study investors' decision-making processes (see

Stantcheva, 2023, as well as Choi and Robertson, 2020, Giglio et al., 2021, Liu et al., 2022, Bauer, Ruof, and Smeets, 2021, Brauer, Hackethal, and Hanspal, 2022, Chinco, Hartzmark, and Sussman, 2022, Gargano and Rossi, 2023). The target population for our study consists of individual landlords who purchased rental properties between 2006 and 2019. To reach a representative sample of this audience, we distributed our survey to members of the Australian Landlords Association (ALA). This association represents a group of small, non-institutional landlords who are Australian residents.

Section 5.1 provides an overview of the structure of the survey (the questions are reported in Appendix B), while Section 5.2 describes our analysis and findings.

5.1 Overview of the Survey

The survey consists of 3 sections, and was administered by email between October 9 and October 30 in 2023.[23] Of the 900 ALA members invited to take the survey, 296 started the survey, and 264 completed it. Thus, both our response rate (32.89%) and attrition rate (10.81%) are in line with what typically observed in these studies (Stantcheva, 2023).

The first section of the survey begins by asking the respondents to confirm that they are landlords, and to share when they purchased their rental property (or properties): 76% of respondents bought a rental property in the sample period of our study (between 2006 and 2019). We select this group of respondents as the sample for our analysis. The section then contains the key part of the survey, which ask about the reasons for purchasing a rental property. We first pose our question in an open-ended format, in which respondents can describe their motives in their own words. We then provide a list of possible motivations, and ask the respondents to assess the importance of each motivation.

The second section of the survey contains multiple choice questions on risk preferences and financial literacy (based on Lusardi and Mitchell, 2011), and the third section contains

[23]Since several meta-studies have concluded that reminders are one of the most important factor to predict response rates (see Fan and Yan (2010)), members received a first reminder after 15 days and a second reminder the day before the closing date of the survey.

multiple choice questions on respondent characteristics (age, income sources, location of rental properties, and who they purchased their properties from).

The distribution of responses to the risk preferences and financial literacy questions are reported in Figure A.6 in the Appendix. Overall, respondents have a neutral attitude towards taking risk, and give sensible answers to financial literacy questions.

Figure A.7 shows the distribution of respondent characteristics. The majority of landlords have age greater than 60 years old, and earn rental income above AUD 30,000 per year. Roughly half of the respondents earn annual income between AUD 30,000 and AUD 80,000, or between AUD 80,000 and AUD 180,000. Thus, the typical landlord who purchased between 2006 and 2019 is in retirement age, has middle-income, and earns substantial rental income from her rental(s). This is consistent with the empirical evidence discussed in the previous sections.

Moreover, we find that most landlords own rentals in the same state where they live. This has implications for rental income risk, as we discuss in detail in Section 6.2).

5.2 Evidence on Economic Mechanisms

Our main focus are the questions on the motives for purchasing a rental property, which can be used to disentangle competing economic mechanisms driving individual decisions. Following the suggestions in Stantcheva, 2023 and Bergman et al. (2020), we first include an open-ended question asking to describe the motives in plain words, and then a menu of closed-ended questions. This approach has the advantage of eliciting respondent's opinions without priming them with a given set of options, and of alleviating concerns regarding question framing. We show that our results are consistent when comparing responses to the open- and close-ended questions.

While survey participants first answer the open-ended question, in the discussion below we begin with the responses to the close-ended questions. This is because these results are the most easily interpretable. We then connect the results from the close-ended questions to those

from the open-ended question, which we quantify using text analysis.

5.2.1 Scoring (Close-Ended) Questions

We provide a list of reasons, or motives, to invest in rental properties, and ask respondents to assign to each motive a score from 1 (very irrelevant) to 5 (very important), based on their own views at the time of purchasing their rental property (or properties).[24] The motives are: a) investment income, b) capital gains, c) increased equity in the primary residence, d) low mortgage rates, e) low returns on saving accounts, f) negative gearing, g) safety of real estate as an investment, and h) other. To eliminate the distorting effects of ordering bias (whereby respondents pay more attention to the motives appearing at the top of the list), we randomize the order in which the motives are listed for each participant– except for "other", which is always appearing at the bottom of the list.

Figure 8 shows the distribution of scores allocated to each motive, separately for respondents who are and are not retirees. The investment income motive receives a score of 4 or 5 from 80% of retirees (45% of retirees assign a score of 5), but from only 51% of non-retirees. The "capital gains" motive receives a score of 4 or 5 from 65% of retirees, and from more than 90% of non-retirees. For non-retirees, capital gains is the motive with the highest frequency of scores equal to 5 (52%). Higher equity in the primary residence has average scores below 4 for both retirees and non-retirees. Low mortgage rates and negative gearing (using negative income from rental properties as a tax shield) receive mostly scores below 4 from retirees. However, they receive scores of 4 and 5 from roughly 40% and 55% of non-retirees, respectively. Finally, 55% of retirees and 45% of non-retirees assign scores of 4 and 5 to low returns on saving accounts, and both retirees and non-retirees assign scores of 4 and 5 to the safety of real estate as an investment asset.

Table 6 provides statistical tests for differences in scores across motivations and across

[24] As suggested by Dillman, Smyth, and Christian (2014), using a bipolar ordinal scale as opposed to a unipolar scale (i.e., very important, somewhat important, slightly important, and not important at all) has the advantage of not priming respondents in a specific direction.

landlord groups (retirees and non-retirees). We first test, for each motive, the null that retirees and non-retirees assigned the same average score. Because of the ordinal nature of the data, and the need to compare distributions of responses given by different sets of individuals, we perform the Wilcoxon rank-sum test (i.e., the non parametric equivalent of the t-test for *unpaired* samples). We find that retirees assign higher scores to the income motive, and that the difference in scores between retirees and non-retirees is highly statistically significant (t-stat of 4.1). Retirees also assign higher scores than non-retirees to the "low returns on savings" motive (t-stat of 1.9), and significantly lower scores than non-retirees to capital gains (t-stat of -3.7), negative gearing (t-stat of -3.1), and low mortgage rates (t-tstat of -2.2). We find no difference for the "equity from primary residence motive". However, the average score for this motive is quite low for both groups (2.75 for retirees and 2.89 for non-retirees), which suggests that this was not considered a key reason for purchasing rental properties.

We then test the null that the income motive has the same average score as each other motive, within a group of respondents (retirees or non-retirees). This test compares the distributions of scores given by the same individuals across motives. We test statistical significance using the Wilcoxon signed-rank test (i.e., the non parametric equivalent of the t-test for *paired* samples). For retirees, the income motive has the highest score . The differences with respect to other motives are statistically significant, with the exception of the comparison against safety of real estate (in this case investment income has a higher score, but the difference is not statistically significant). On the other hand, for non-retirees, the income motive has an average score significantly lower than that of capital gains (t-stat of -6.15), and of the safety of real estate (t-stat of -5.3).

Overall, our results highlight that for retirees, or individuals close to retirement age, and over the period from 2006 to 2019, the goal of earning investment income has been the main driver of the decision to purchase rental properties. This is the case even when we run a horse race between the desire to earn income and the desire to earn capital gains. Interestingly, the finding is reversed in the non-retiree sample, for which capital gains are more important than

investment income.

Moreover, the survey results suggest that retirees do not perceive as important several of the alternative channels discussed in the previous sections. Retirees are not motivated by the increase in home equity in their primary residences. They are also not strongly motivated by low cost of capital (low mortgage rates), which is consistent with the evidence in Section 4.4. Also consistent with the evidence in Section 4.4 is the fact that retirees are not strongly motivated by the desire to take advantage of tax shields through negative gearing.

5.2.2 Open-Ended Question

Before the scoring question, we ask the respondents to describe in their own words the motive that drove the decision to invest in a rental property. We summarize keywords in the answers through word clouds (in which the font size and color are based on word frequency). Figure A.8 in the Appendix reports the output for retirees and non-retirees. For retirees, the words "retirement" and "income" are the most frequent, and are three times more frequent than the third most frequent word ("rental"). For non-retirees, the word income is overshadowed by several other terms, including "capital" (which is the most frequent word together with "future" and "retirement") and "growth".

Recent advances in textual analysis allow to perform statistical tests based on answers to open-ended questions (Ferrario and Stantcheva, 2022). We use keyness analysis (Gabrielatos (2018)) to test the null that the words "income" and "capital" have the same relevance for retirees and non-retirees. We strongly reject the null of equal relevance at the 1% significance and find that "income" ("capital") has the highest keyness score for retirees (non-retirees) with a χ^2 stat of 10.71 (6.67).

A natural limitation of analyzing frequencies of single words is that this might overestimate motives that are described by a more limited set of words. Following Ferrario and Stantcheva, 2022 we manually create an "income" and a "capital" topic, which includes a wider range of

words.[25] We find again striking differences across groups. Among those mentioning the income topic, 61% are retirees and 39% are non-retirees. Among those mentioning the capital topic, 67% are non-retirees and 33% are retirees. Moreover, 38% of retirees mention the income topic, but not the capital topic, and only 11% do the opposite. This finding is reversed among non-retirees: 33% only mention the capital topic but not the income topic, and 17% do the opposite.

6 Effects on Homeownership and Income Dynamics

We now turn to the implications of the increase in direct participation to the rental market for homeownership rates and for the riskiness of individual income, in particular for retirees.

6.1 Homeownership Rate

The impact of investors in housing markets has recently been the object of policy debates and news coverage in the United States, Australia, and many other countries. Part of the public debate has been focused on whether higher investors' participation translates into a decrease in the homeownership rate. For instance, it has been argue that in the US even a modest increase in the presence of institutional investors in the housing market may lead to a decrease in the homeownership rate, due to very limited new housing supply.[26]

For what concerns the results in our study, if the increase in the share of landlords takes place at the same time as a substantial increase in the housing stock, and landlord mainly purchase newly constructed properties, the effects on the homeownership rate might be modest. The same is true if new landlords purchase properties from existing landlords, or corporations. On the other hand, if landlords mainly purchase homes that are owner-occupied, and turn them into rentals, then an increase in the share of landlords may lead to a decrease in homeownership.

[25] The income topic includes the following words: income, passive, cash, cashflow, flow, stream, and yield; the capital topic includes wealth, capital, grow, gain, growth, appreciation, appreciating appreciate and money.

[26] Dougherty and Casselman (2023).

Figure 9 provides some descriptive evidence, concerning the relationship between the volume of buy-to-let transactions and the homeownership rate. As mentioned earlier, buy-to-let activity in our data is likely driven by individual investors. If these small investors were just purchasing a proportional amount of newly built properties, or if they were mainly purchasing existing rentals from other landlords, we would not expect to see a strong association between local homeownership rates and buy-to-let activity.

The figure shows a bin scatter plot depicting the association across postcodes between the increase in the percentage of buy-to-let (out of all properties) from 2006 to 2019, and the homeownership rate. We find that a 10% larger increase in buy-to-let volume is associated with a 5% larger drop in the homeownership rate at the postcode level. This suggests that new landlords are likely purchasing owner-occupied homes, and converting them into rentals.

We dig deeper into this evidence in Table 7. Using the sample of buy-to-let transactions, we estimate the following regression equation:

$$\mathbb{1}(Owner\_Occupied)_i = \beta y_t + \mathcal{B}_X X_{p,t} + \alpha_p + \tau_t + \epsilon_i, \tag{5}$$

where $\mathbb{1}(Owner\_Occupied)_i$ is a dummy equal to one if the buy-to-let property was previously an owner-occupied property, and y_t is the level of rates (6-month CDs, 2-year bond, 10-year bonds) in the month in which the transaction takes place. The vector $X_{p,t}$ contains postcode-level (p) time varying controls, including lagged price, rent and population growth in the year before the transaction, while α_p and τ_t are postcode and month fixed effects.

Estimates of the coefficient β capture the association between the level of rates and the likelihood that a buy-to-let property is transitioning from the ownership market into the rental market. We find that estimates of β are statistically significant and negative, both when estimating equation 5 with OLS (linear probability model) and when using Logit. Thus, lower rates are associated with a higher likelihood of housing properties transitioning into the rental market, which is consistent with a drop in the homeownership rate.

To further corroborate this conjecture, we turn back to the survey of ALA members that we conducted in October 2023 (see Section 5). In the survey, we ask landlords who purchased their rental properties between 2006 and 2019 whether they bought an owner occupied property, a new construction, a rental property from a landlord, another type of property, or if they do not know. As shown in Figure 10, out of those who did know the previous use of their property, 45.5% report to have purchased an owner-occupied unit, and only 26% (22%) report to have purchased a rental property from a landlord (a new construction).

We have previously shown that lower rates are associated with an increase in the fraction of individual landlords (more specifically, middle-income retirement-age landlords), and an increase in buy-to-let activity. Combined with the results in this section, our findings suggest that lower rates, by stimulating new landlords' entry, reduce the homeownership rate.

6.2 Exposure of Investment Income to Local Economic Shocks

While the literature has explored extensively labor income dynamics and risk (see Meghir and Pistaferri, 2011 for a review of the literature), much less is known about rental income, even though, as shown in Figure 2 in the Appendix, it accounts for a large fraction of total income for both middle-age and retirement-age landlords. Then, what are the implications of the increase in the share of landlords for individual income risk?

Investment income from a diversified portfolio of financial assets has low exposure to economic shocks specific to the region in which an individual lives. This is desirable, since local economic shocks may already affect labor income and other individual outcomes, and a local downturn is a period in which local households' marginal utility from consumption is high.

However, rental income is instead likely highly correlated with local economic shocks, and individual landlords are unlikely to hold multiple properties and to diversify their real estate assets across locations. Every two years, the Australian Bureau of Statistics runs the Survey of Income and Housing, which contains questions on the number of rental properties owned. In

the 2018 survey, 71% of landlords own one rental unit, and 18% own two units.

Moreover, rental properties tend to be located close to the primary residence of the landlord. In the ALA Survey, we find that only 15% of respondents who bought their property (or properties) between 2006 and 2019 owned rentals outside their state (see Figure A.7 in th Appendix, showing the distribution of answers to Q6 in Section 3 of the survey). Roughly half of the respondents only owned rental properties in the metropolitan area where they live.[27]

The increase in the share of landlords from 2004 to 2019 may then have resulted in higher exposure of the income of middle-age and retirement-age individuals to local shocks, and thus to an increase in the riskiness of financial income.

To provide some insights on the magnitude of this effect, we turn again to the data on individual tax filings, and construct an empirical exercise showing the extent to which landlords' income is more exposed to local economic conditions. For this exercise, we focus on Perth, the capital city of Western Australia. Most business activities in this area are directly or indirectly tied to mining, with iron ore being one of the region's main exports. Thus, local economic activity is strongly influenced by the price of iron ore, which in turn is determined by international demand, and especially by demand from steel mills located in China.[28] In general, fluctuations in iron ore prices are poorly correlated with fluctuations in stock prices and other macroeconomic factors. Figure A.9 in the Appendix reports year-over-year price changes in iron ore spot prices in the main Chinese import hub (the port of Tianjin), over the period from 2003 to 2019. Price growth is high and steady in the first part of the sample, even during the Great Recession. However, it then falls and becomes negative from 2012 to 2016.

In our test, we estimate the impact of fluctuations in iron ore prices on individual income in Western Australia. In particular, we focus on the heterogeneous effects on individuals who

[27]The Rental Investors Surveys, run by the Australian Bureau of Statistics in the 90s (until 1997) delivers similar results: for 71% of landlords, primary residence and rental properties were located in the same city. Only 18% of landlords owned properties located in the same state but in a different city than their residence. Finally, only 11% of landlords owned properties in a different state than the one of their primary residence.

[28]See for example the evidence presented by Kalouptsidi (2014).

are, and are not, landlords. We estimate the following regression equation:

$$\log(Inc_{i,t}) = b \log(P_{IronOre,t-1}) + BX_i + \alpha_t + e_i, \tag{6}$$

where $\log(Inc_{i,t})$ is the log of total income, or of one of the components of income, for individual i in fiscal year t, $log(P_{IronOre,t-1})$ is the log of the average iron ore price over a 12 months period, lagged by one year, α_t is a fiscal year fixed effect, and X_i is a vector of individual controls, including age, partner status, occupation code, and gender. We report separately estimates for middle-age (panel A) and retirement-age (panel B) individuals in Table 8.

In column 1 of both panels of the table the dependent variable is the log gross rental income earned by an individual over the year. We find a strong and positive relationship between rental income and iron ore prices, for both middle-age and retirement-age individuals. Point estimates are similar across the two groups, and suggest that a 10% change in iron ore prices coincides with a 2.5% change in individual rental income. There is no relationship between fluctuations in iron ore prices and dividend (column 2), or interest (column 3) income.

The sensitivity of income from salary and pensions (column 4) differs between middle-age and retirement-age individuals. There is a positive and significant relationship for middle-age individuals, but no relationship for the retirement-age group. This is to be expected, since retirement-age individuals receive pensions and other retirement income streams that are independent of current local economic conditions. On the other hand, middle-age individuals are part of the local workforce, and see their labor income, on average, reduced when iron ore prices are low and the local economy is in a downturn. A 10% change in iron ore prices results in a change in the salary income earned by middle-age individuals of 0.65%.

Finally, in column 5, we set the dependent variable equal to the log of the individual's total income, and expand the specification in equation (6) to also include an interaction term between the log price of iron ore and a dummy equal to one if the individual is a landlord. The interaction captures the incremental effect on total income for landlords, with respect to the

baseline for non-landlords. The term has large, positive, and statistically significant coefficients for both middle-age and retirement-age individuals.

For middle-age individuals, a 10% fluctuation of iron ore prices changes the total income of non-landlords by 0.65%, consistent with our previous estimates. However, for landlords, total income changes by an additional 0.63%. Thus, income sensitivity to iron ore prices for middle-age individuals who are landlords is twice as large as the one for non-landlords. For retirement-age individuals, the baseline effect of fluctuations of iron ore prices on total income is not significant, consistent with our previous results. For landlords, the coefficient is positive and significant: a 10% change in iron ore prices leads to a 1.1% change in total income.

These effects are large, and highlight how rental real estate investments increase income sensitivity to local economic shocks. By investing in local real estate, individuals are giving up on diversification, and are increasing the riskiness of their income stream.

7 Conclusions

There is limited empirical evidence on individuals' direct investments in rental properties. Using fiscal data from Australia, we document that more than one in five retirement-age individuals with median or high income is a landlord, and show that this share has substantially increased over the last 20 years. In particular, in relative terms, the fraction of middle-income retirement-age individuals who are landlords has increased by 80%. We argue that this pattern has been driven by declines in interest rates, and by *reaching for income*. The reaching for income mechanism is propelled by the fact that certain individual investors prefer consuming investment income, rather than realized capital gains. When income from money market and safe bond investments declines, those who are reliant on investment income to finance consumption, such as retirees, may rebalance the allocation of their wealth towards assets paying high recurring income in the new low-rates environment.

We conduct several tests to show that the increase in the share of landlords is unlikely to

be driven by house price growth or the relaxation of mortgage lending constraints. First, as already mentioned, the increase in the share of landlords is highly heterogeneous across age groups. The largest increase is for retirement-age individuals, of age 60 or above, and who have middle income within their age group. We show that these individuals are the most likely to earn positive net income, after expenses, from their properties. Moreover, when studying the composition of gross financial income, we find that, as interest rates drop, retirement-age individuals substitute dwindling interest rates payments with real estate income.

We also show that, while there is an increase in the volume of properties purchased to be re-listed as rentals (buy-to-let) in response to interest rates drops, there is no effect of rates drops on speculative investments (house flips). Finally, we find that the increase in rental property investments in response to rates cuts is larger in areas that offer higher rental yields.

To directly identify the drivers of investors' decisions, we administer to a sample of small individual Australian landlords a survey of our design. The survey is aimed at testing competing motives for investing in rental properties during the period of declining interest rates. Responses to both open-ended and close-ended questions show that retirees rank the desire to earn rental income higher than any other competing motive.

Reaching for income through rental properties has two important aggregate effects, which we test in the data. First, new individual landlords mainly purchase their properties from owner-occupiers. Thus, reaching for income reduces the homeownership rate. Second, higher reliance on rental income makes retirees' income streams more exposed to local economic shocks.

Combined, our findings provide novel evidence on individual landlords' behavior, and on the effects of interest rate fluctuations on individuals' rental investments and, ultimately, on the housing market.

References

Agarwal, S., G. Amormin, I. Ben-David, S. Chomsisengphet, T. Piskorski, and A. Seru. 2017. Policy intervention in debt renegotiation: Evidence from the home affordable modification program. *Journal of Political Economy* 125:654–712.

Agarwal, S., L. Hu, and X. Huang. 2016. Rushing into the American dream? House price growth and the timing of homeownership. *Review of Finance* 13:2183–218.

Amberg, N., T. Jansson, M. Klein, and A. Rogantini Picco. 2022. Five facts about the distributional income effects of monetary policy. American Economic Review: Insights, Forthcoming.

Armona, L., A. Fuster, and B. Zafar. 2019. Home price expectations and behavior: Evidence from a randomized information experiment. *Review of Economic Studies* 86:1371–410.

Badarinza, C., J. Y. Campbell, and T. Ramadorai. 2016. International comparative household finance. *Annual Review of Economics* 8:111–44.

Badarinza, C., and T. Ramadorai. 2018. Home away from home? Foreign demand and London house prices. *Journal of Financial Economics* 130:532–55.

Baker, M., S. Nagel, and J. Wurgler. 2007. The effect of dividends on consumption. *Brookings Papers on Economic Activity* 231–92.

Bauer, R., T. Ruof, and P. Smeets. 2021. Get real! individuals prefer more sustainable investments. *Review of Financial Studies* 34:3976–4043.

Bayer, P., C. Geissler, K. Mangum, and J. W. Roberts. 2020. Speculators and middlemen: The strategy and performance of investors in the housing market. *Review of Financial Studies* 33:5212–47.

Becker, B., and V. Ivashina. 2015. Reaching for yield in the bond market. *Journal of Finance* 70(5).

Bergman, A., A. Chinco, S. Hartzmark, and A. B. Sussman. 2020. Survey curious? start-up guide and best practices for running surveys and experiments online. Working Paper.

Brauer, K., A. Hackethal, and T. Hanspal. 2022. Consuming dividends. *Review of Financial Studies* .

Case, K. E., R. J. Shiller, and A. K. Thomson. 2015. What have they been thinking? Home buyer behavior in hot and cold markets - a 2014 update. Tech. Rep. 1876R, Cowles Foundation.

Chetty, R., L. Sandor, and A. Szeidl. 2017. The effect of housing on portfolio choice. *Journal of Finance* LXXII:1171–212.

Chinco, A., S. Hartzmark, and A. B. Sussman. 2022. A new test of risk factor relevance. *Journal of Finance* 77:2183–238.

Chinco, A., and C. Mayer. 2016. Misinformed speculators and mispricing in the housing market. *Review of Financial Studies* 29:486–522.

Choi, J. J., and A. Z. Robertson. 2020. What matters to individual investors? Evidence from the horse's mouth. *The Journal of Finance* 75:1965–2020.

Coibion, O., Y. Gorodnichenko, L. Kueng, and J. Slivia. 2017. Innocent bystanders? Monetary policy and inequality. *Journal of Monetary Economics* 88:70–89.

Daniel, K., L. Garlappi, and K. Xiao. 2021. Monetary policy and reaching for income. *Journal of Finance* 76:1145–167.

Demers, A., and A. L. Eisfeldt. 2021. Total returns to single family rentals. *Real Estate Economics* 50:7–32.

Deng, Y., L. Liao, J. Yu, and Y. Zhang. 2021. Capital spillover, house prices, and consumer

spending: Quasi-experimental evidence from house purchase restrictions. *Review of Financial Studies (forthcoming)* .

Di Maggio, M., and M. Kacperczyk. 2017. The unintended consequences of the zero lower bound policy. *Journal of Financial Economics* 123.

Di Maggio, M., A. Kermani, and K. Majlesi. 2020. Stock market returns and consuption. *Journal of Finance* LXXV:3175–219.

Dillman, D., J. Smyth, and L. Christian. 2014. *Internet, phone, mail and mixed-mode surveys: The tailored design method*. John Wiley and Sons.

Dougherty, C., and B. Casselman. 2023. When it's easy to be a landlord, no one wants to sell. *The New York Times* .

Fagereng, A., L. Guiso, D. Malacrino, and L. Pistaferri. 2021. Heterogeneity and persistence in returns to wealth. *Econometrica (forthcoming)* .

Fan, W., and Z. Yan. 2010. Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior* 26:132–9.

Favilukis, J., and S. Van Nieuwerburgh. 2021. Out-of-town home buyers and city welfare. *Journal of Finance* 76:2577–638.

Ferrario, B., and S. Stantcheva. 2022. Eliciting people's first-order concerns: Text analysis of open-ended survey questions. *AEA Papers and Proceedings* 112:163–69.

Gabriel, S., M. Iacoviello, and C. Lutz. 2020. A crisis of missed opportunities? Foreclosure costs and mortgage modification during the great recession. *Review of Financial Studies* 34:864–906.

Gabrielatos, C. 2018. Keyness analysis: Nature, metrics and techniques. In C. Taylor and M. A, eds., *Corpus Approaches to Discourse: A Critical Review*, 225–58. Routledge.

Gargano, A., M. Giacoletti, and E. Jarnecic. 2022. Local experiences, attention and spillovers in the housing market. Journal of Finance, forthcoming.

Gargano, A., and A. Rossi. 2023. Goal setting and saving in the fintech era. Journal of Finance (forthcoming).

Garriga, C., P. Gete, and A. Tsouderou. 2021. Investors and housing affordability. Working Paper.

Giglio, S., M. Maggiori, J. Stroebel, and S. Utkus. 2021. Five facts about beliefs and portfolios. *American Economic Review* 111:1481–522.

Gomes, F., M. Haliassos, and T. Ramadorai. 2021. Household finance. *Journal of Economic Literature* 59:919–1000.

Graham, J. R., and A. Kumar. 2006. Do dividend clienteles exist? evidence on dividend preferences of retail investors. *Journal of Finance* LXI:1305–36.

Gurkaynak, R. S., B. P. Sack, and E. T. Swanson. 2005. The sensitivity of long-term interest rates to economic news: Evidence and implications for macroeconomic models. *American Economic Review* 95:425–36.

Gurun, U., J. Wu, S. C. Xiao, and S. W. Xiao. 2022. Do wall street landlords undermine renters' welfare? *Review of Financial Studies* .

Hau, H., and S. Lai. 2016. Asset allocation and monetary policy: Evidence from the eurozone. *Journal of Financial Economics* 12:309–29.

Haughwout, A., D. Lee, J. Tracy, and W. van der Klaauw. 2011. Real estate investors, the leverage cycle, and the housing market crisis. Working Paper.

Jiang, H., and Z. Sun. 2019. Reaching for dividends. *Journal of Monetary Economics* 115:321–38.

Jorda, O. 2005. Estimation and inference of impulse responses by local projections. *American Economic Review* 95(1):161–82.

Kalouptsidi, M. 2014. Time to build and fluctuations in bulk shipping. *American Economic Review* 104:564–608.

Kaplan, G., K. Mitman, and G. L. Voilante. 2020. The housing boom and bust: Model meets evidence. *Journal of Political Economy* 128:3285–345.

Keys, B. J., T. Piskorski, A. Seru, and V. Vig. 2013. *Mortgage financing in the housing boom and bust*, 143–204. National Bureau of Economic Research.

Keys, B. J., A. Seru, and V. Vig. 2012. Lender screening and the role of securitization: Evidence from prime and subprime mortgage markets. *Review of Financial Studies* 25:2071–108.

Korevaar, M. 2021. Reaching for yield: How investors amplify housing booms and busts. Working Paper.

Kuchler, T., and B. Zafar. 2019. Personal experiences and expectations about aggregate outcomes. *Journal of Finance* 74:2491–542.

Kuhn, M., M. Schularick, and U. I. Steins. 2020. Income and wealth inequality in america, 1949–2016. *Journal of Political Economy* 128:3469–519.

Kuttner, K. N. 2001. Monetary policy surprises and interest rates: Evidence from the fed funds futures market. *Journal of Monetary Economics* 47:523–644.

Lian, C., Y. Ma, and C. Wang. 2019. Low interest rates and risk-taking: Evidence from individual investment decisions. *Review of Financial studies* 32:2107–48.

Liu, H., C. Peng, W. A. Xiong, and W. Xiong. 2022. Taming the bias zoo. *Journal of Financial Economics* 143:716–41.

Lusardi, A., and O. S. Mitchell. 2011. Financial literacy around the world. *Journal of Pension Economics and Finance* 10:497–508.

Meghir, C., and L. Pistaferri. 2011. *Handbook of labor economics*, chap. Chapter 9 - earnings, consumption and life cycle choices. Elsevier.

Mian, A., and A. Sufi. 2011. House prices, home equity-based borrowing, and the U.S. household leverage crisis. *The American Economic Review* 101:2132–56.

Peydro, L. J., A. L. Andersen, N. Johannesen, and M. Jorgensen. 2021. Monetary policy and inequality. Working Paper.

Piazzesi, M., and M. Schneider. 2016. Housing and macroeconomics. In J. Taylor and H. Uhlig, eds., *Handbook of Macroeconomics*, vol. 2, 1547–640. Elsevier.

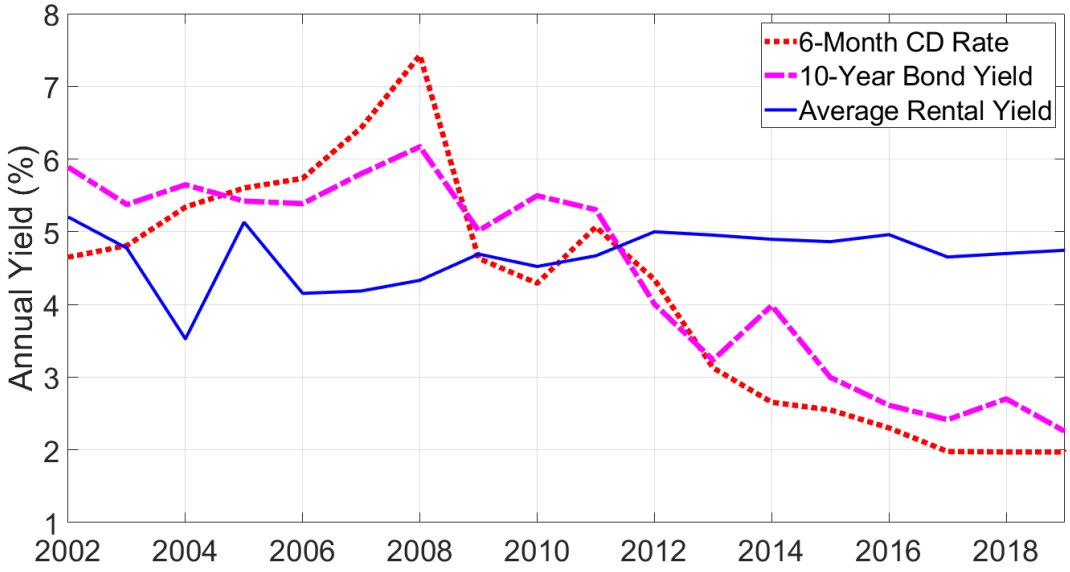
Plagborg-Moller, M., and C. K. Wolf. 2021. Local projections and vars estimate the same impulse responses. *Econometrica* 89:955–80.

Smith, M., O. Zidar, and E. Zwick. 2020. Top wealth in America: New estimates and implications for taxing the rich. Working Paper.

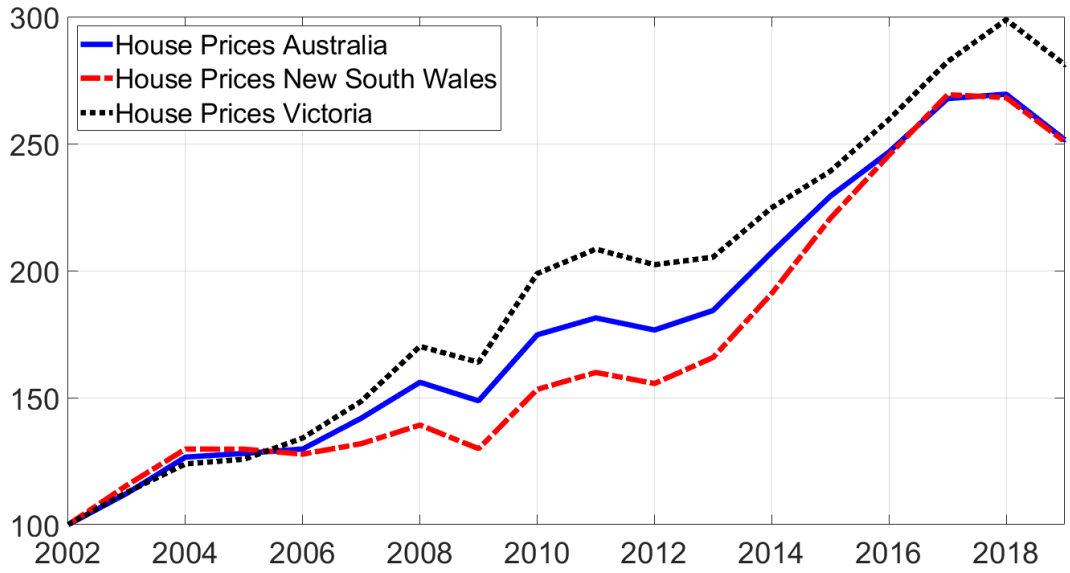
Stantcheva, S. 2023. How to run surveys: A guide to creating your own identifying variation and revealing the invisible. *Annual Review of Economics* 15:205–34.

te Kaat, D. M., C. Ma, and A. Rebucci. 2021. Real effects of the ECB's quantitative easing: A housing portfolio channel. Working Paper.

Wilcoxon, F. 1945. Individual comparisons by ranking methods. *Biometrics Bulletin* 1(6):80–3.

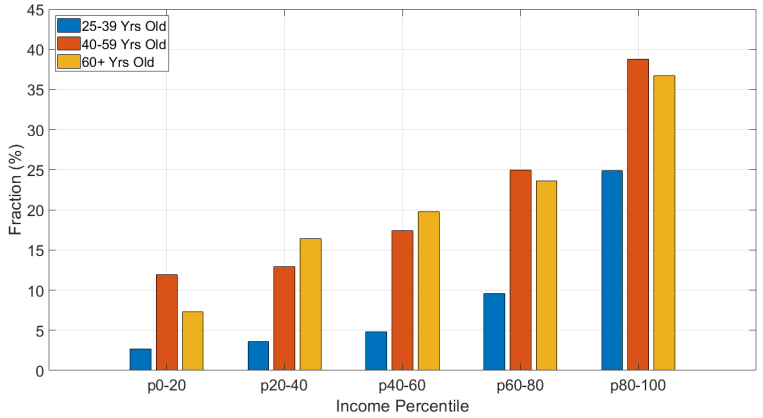


(a) Annualized Yields

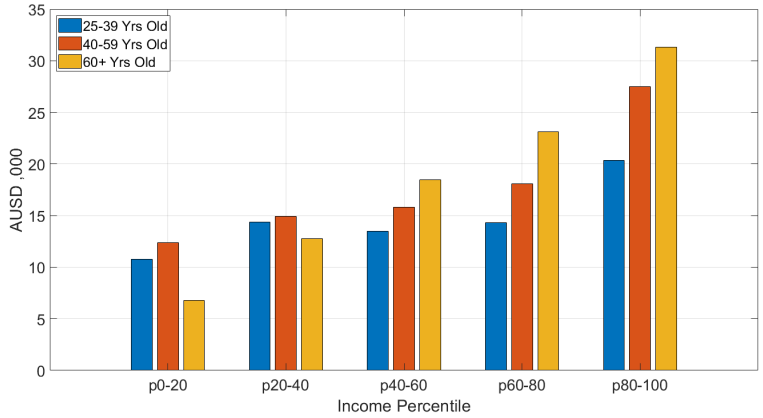


(b) House Price Indices

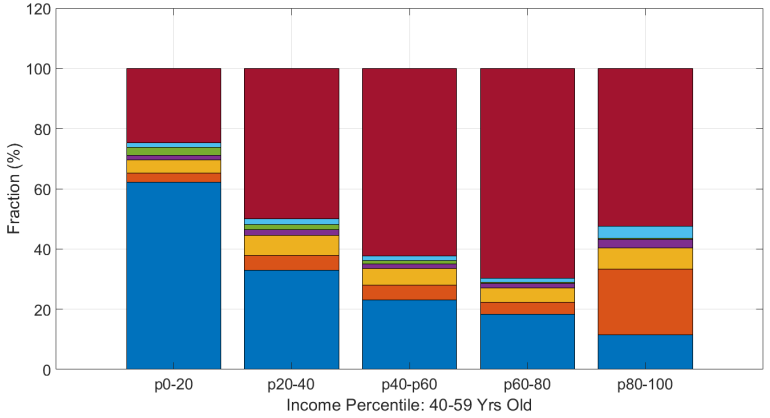
Figure 1: Panel (a) of the figure reports the time series of annualized 6-month certificates of deposit rates, 10-year government bond yields, and average rental yields, for the years from 2002 to 2019. Average rental yields are calculated as the average rental yields across postcodes, and postcode yields are computed as the ratio of median annual rent in the postcode and the price of the median house in the postcode (based on indices provided by CoreLogic). Panel (b) reports the evolution of house prices in Australia, New South Wales, and Victoria (the latter two are the most populous states in Australia) over the period from 2002 to 2019. The Australia index is a value weighted mean of median house prices across all the main metropolitan areas in the country. All house price indices are normalized to be equal to 100 in 2002.



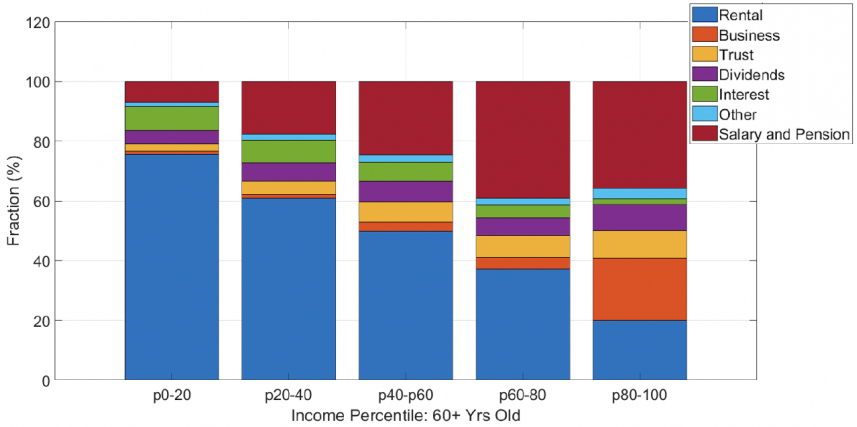
(a) Fraction of Landlords, by Income within Age (2017-2019)



(b) Landlords' Rental Income, by Income within Age (2017-2019)

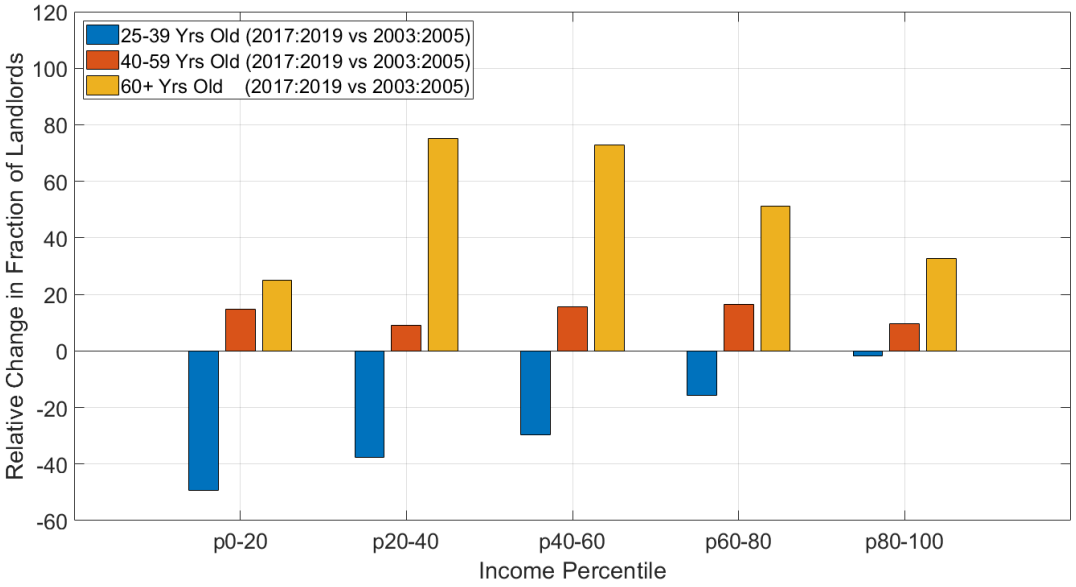


(c) Income Composition, for Middle Age Landlords (2017-2019)

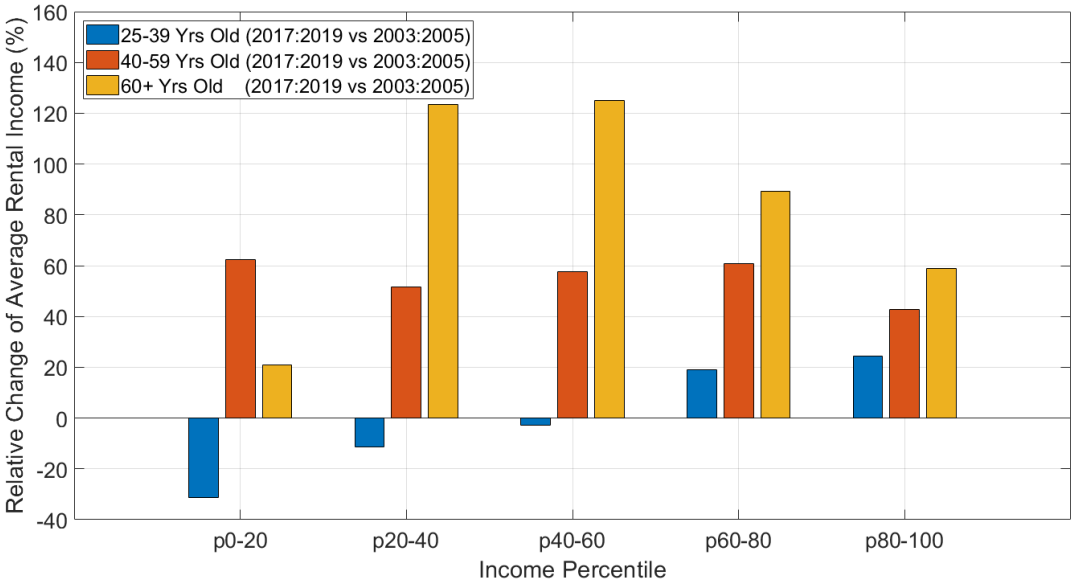


(d) Income Composition, for Retirement Age Landlords (2017-2019)

Figure 2: Panel (a) shows the fraction of landlords while Panel (b) shows the average rental income for landlords. The statistics are computed within income quintiles for three age groups: 25 to 39 (young), 40 to 59 (middle age), and 60 and older (retirement age). The bottom panels show the composition of gross income for landlords, across income quintiles for middle age (40 to 59) in panel (c), and 60 and older (panel d). The results are based on the ATO individual tax filers 1% sample, for the years from 2017 to 2019. All income estimates are expressed in terms of 2019 Australian Dollars.



(a) Relative Change in the Share of Landlords (2015:2019 vs 2003:2007)



(b) Relative Change in Average Rental Income (2015:2019 vs 2003:2007)

Figure 3: The figure shows the relative change in the share of landlords (panel a) and in average rental income (panel b) between the years from 2003 to 2005 and the years from 2017 to 2019. The statistics are computed within income deciles for three age groups: 25 to 39 (young), 40 to 59 (middle age), and 60 and older (retirement age).

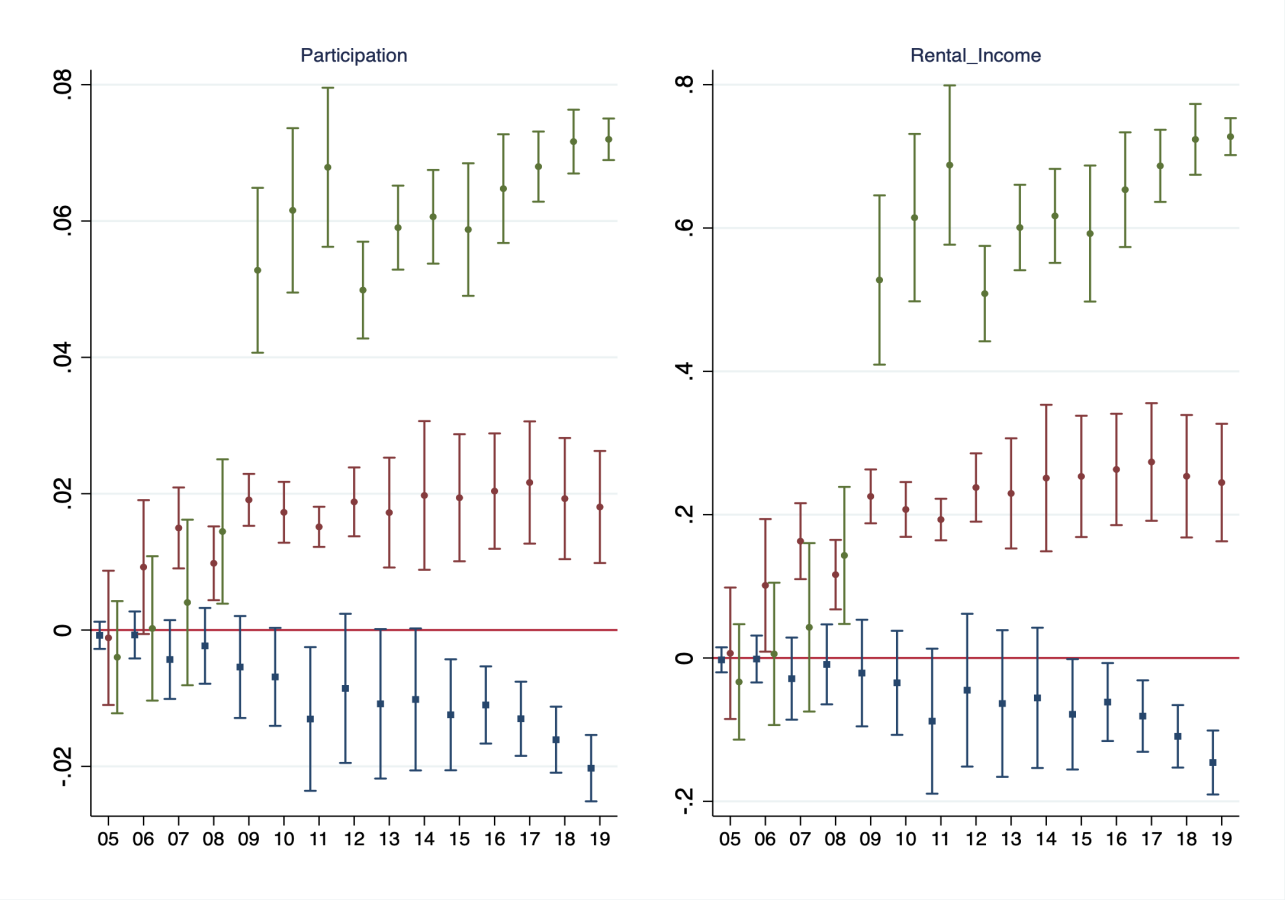


Figure 4: The figure displays estimates of the parameters $\delta_{\tau \times Young}$ (blue), $\delta_{\tau \times Mid}$ (red) and $\delta_{\tau \times Senior}$ (green) from the following regression equation, estimated on data from individual tax filings:

$$y_i = \sum_{\tau=2005}^{2019} \delta_{\tau \times Young}\Big(I_\tau \times I_{20\ to\ 39}\Big) + \sum_{\tau=2005}^{2019} \delta_{\tau \times Mid}\Big(I_\tau \times I_{40\ to\ 59}\Big) + \sum_{\tau=2005}^{2019} \delta_{\tau \times Senior}\Big(I_\tau \times I_{60+}\Big) + \alpha I_{20\ to\ 39} + \beta I_{40\ to\ 59} + \mathcal{B}X_i + \eta_l + e_i$$

where y_i is either a dummy equal to one if the individual is a landlord (left figure) or the log of one plus rental income (right figure), I_τ is a fiscal year dummy, $I_{20\ to\ 39}$, $I_{41\ to\ 60}$ and I_{60+} denote dummies equal to one if the individual is 20 to 39 years old, 40 to 59 years old or 60 years old or older, X_i is a vector of controls, including gender, partner status and occupation category, and η_l is a location fixed effect, based on the area of residence (see Section 2) of individual i. Standard errors are double-clustered by area of residence and fiscal year.

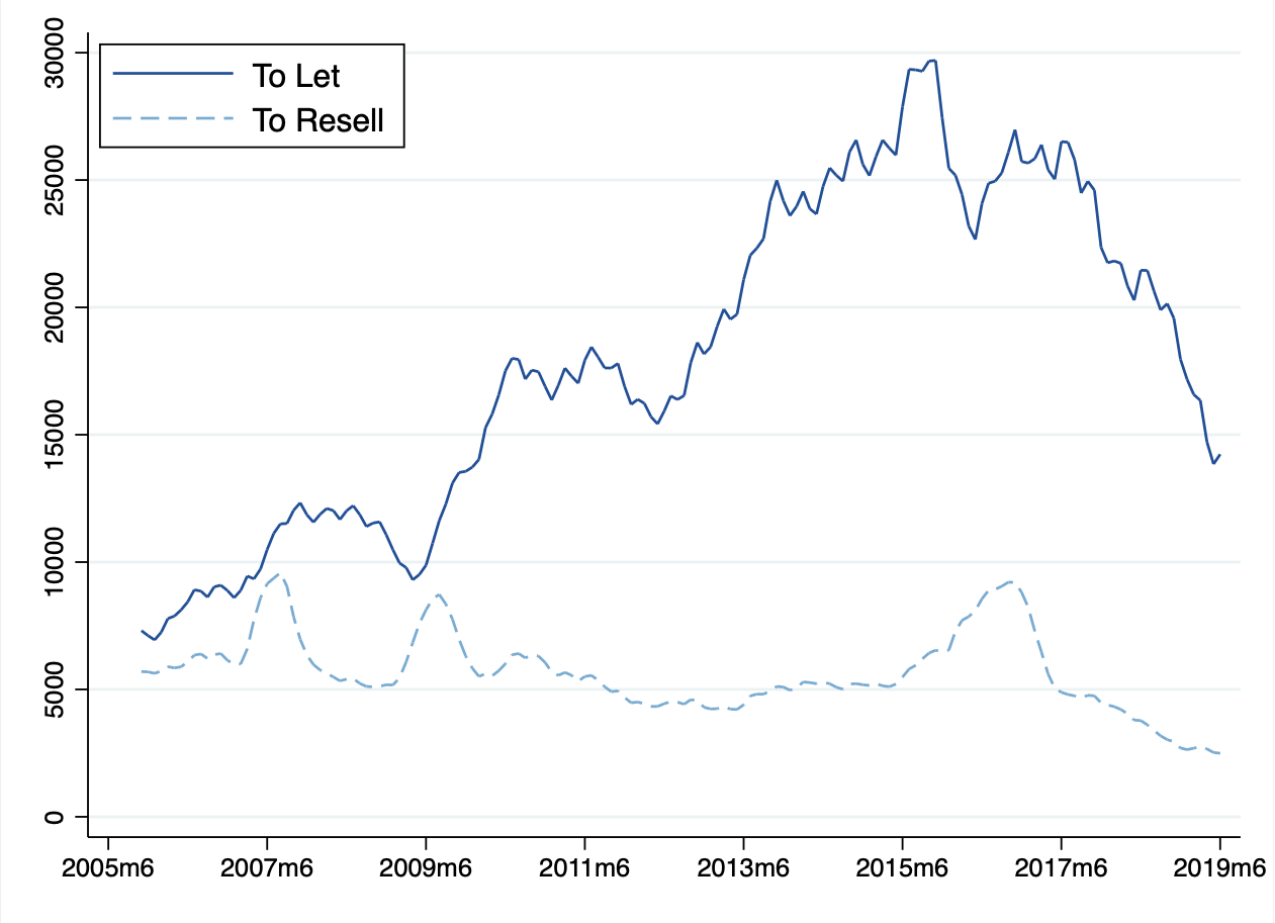
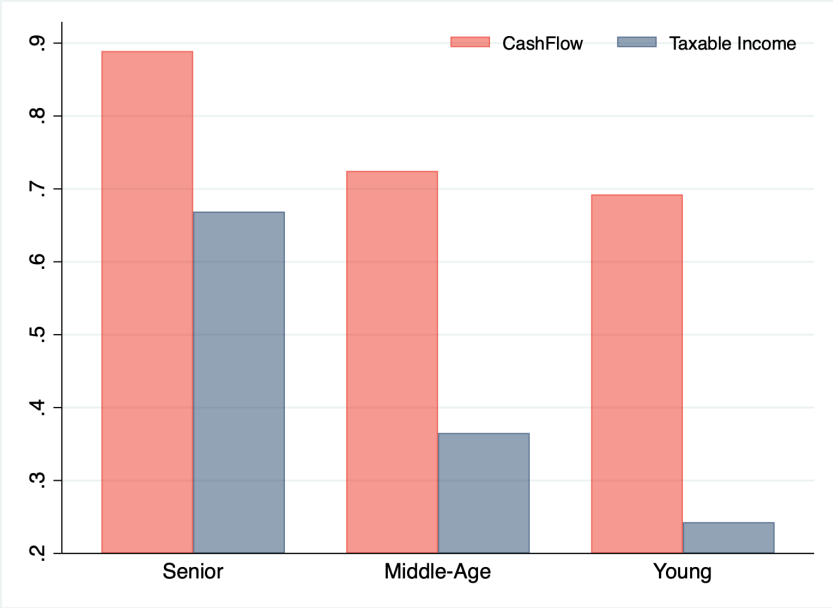
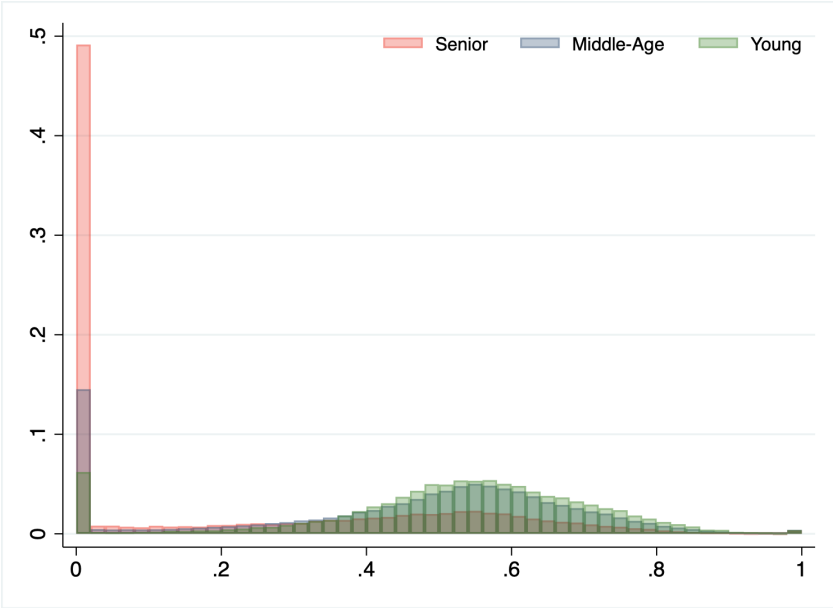


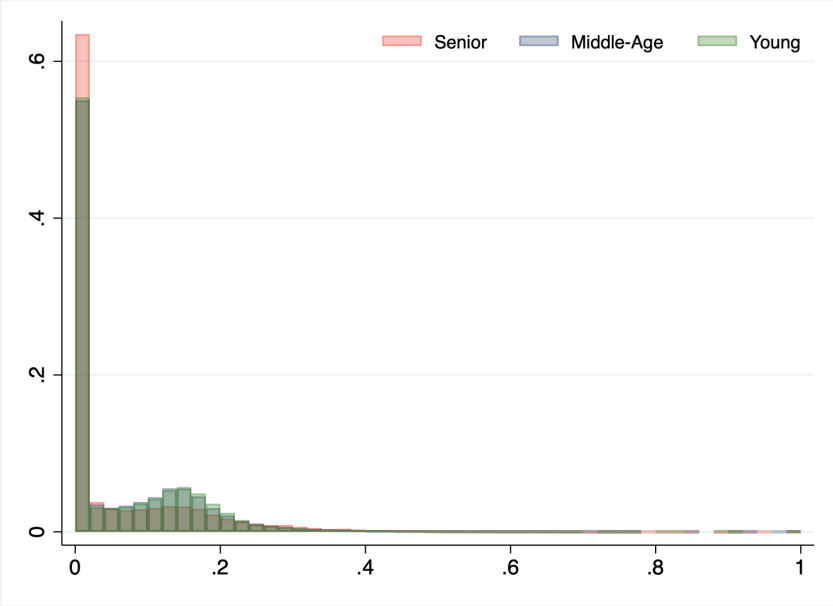
Figure 5: The figure shows the 6-month moving sum of the number of buy-to-let (blue solid line) and buy-to-resell (blue dashed line) properties. We identify a property purchase as a *buy-to-let* if the property is re-listed for rent within 9 months from the sale. We identify the purchase as a *buy-to-resell* if the property is either listed for sale or sold within 9 months from the sale.



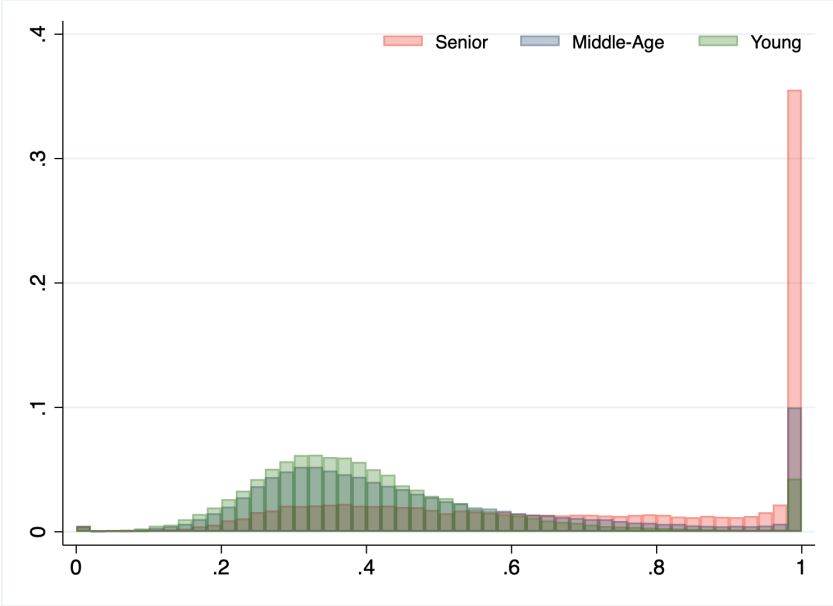
(a) Share of Individuals Declaring Positive Rental Income



(b) Interest



(c) Capital Works



(d) Other

Figure 6: Panel (a) displays the fraction of individuals declaring positive rental cash-flows (i.e., the difference between gross rental income and the sum of interest and capital works) and taxable income (i.e., the difference between gross rental income and the sum of interest, capital works and other deductions). Panels (b), (c) and (d) display the distribution of interest payments, capital works, and other, as a fraction of total deductions (interest payments + capital works + other) and across individuals. All estimates are based on values in terms of 2019 Australian Dollars and are based on individual tax filings from 2017-2019.

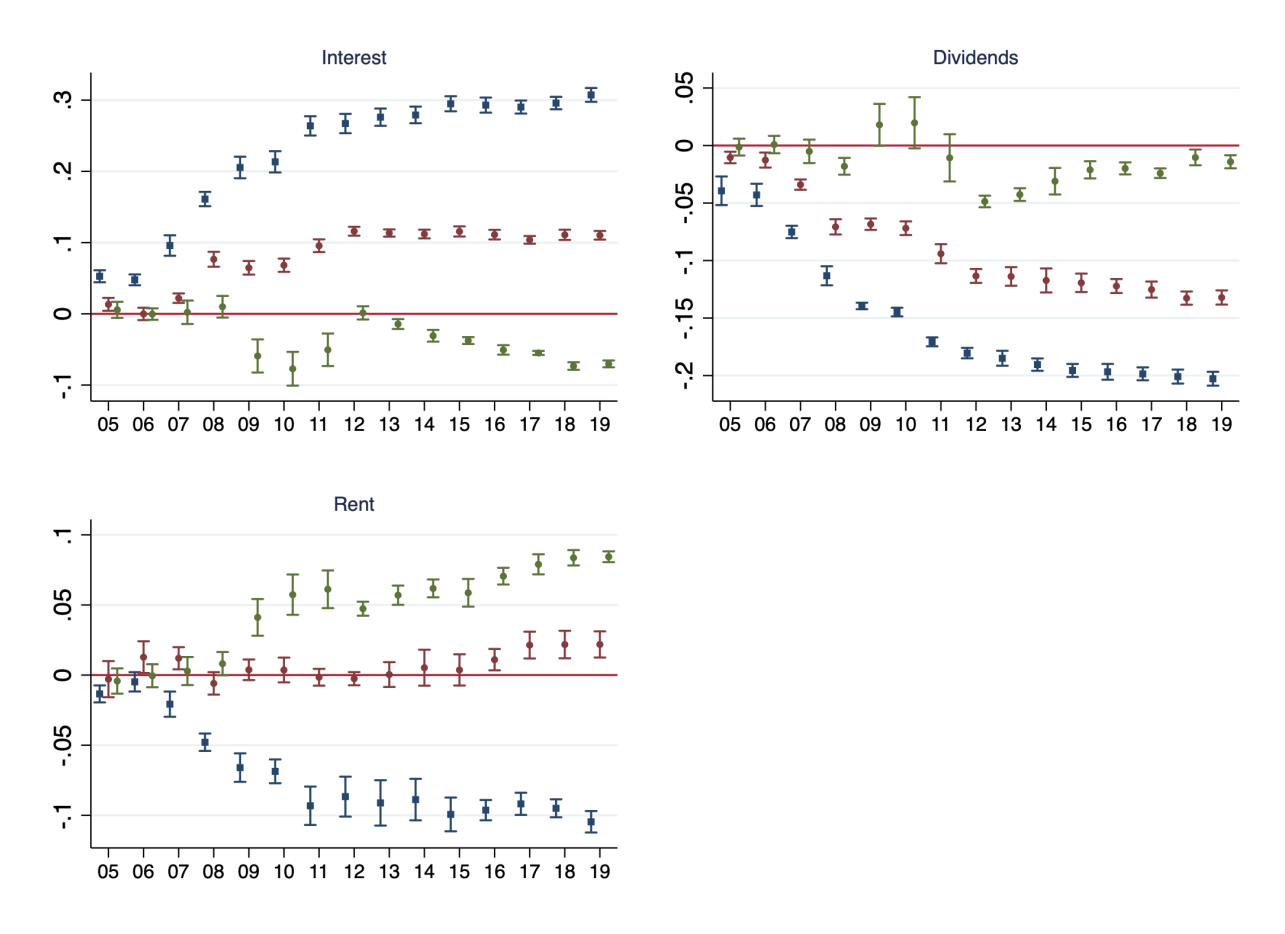


Figure 7: The figure displays estimates of the parameters $\delta_{\tau \times Young}$ (blue), $\delta_{\tau \times Mid}$ (red) and $\delta_{\tau \times Old}$ (green) from the following regression equation, estimated on data from individual tax filings:

$$y_i = \sum_{\tau=2005}^{2019} \delta_{\tau \times Young}\Big(I_\tau \times I_{20\ to\ 39}\Big) + \sum_{\tau=2005}^{2019} \delta_{\tau \times Mid}\Big(I_\tau \times I_{40\ to\ 59}\Big) + \sum_{\tau=2005}^{2019} \delta_{\tau \times Senior}\Big(I_\tau \times I_{60+}\Big) + \\ + \alpha I_{20\ to\ 39} + \beta I_{41\ to\ 60} + \mathcal{B}X_i + \eta_l + e_i$$

where y_i is either the interest (top left), dividend (top right) or rental (bottom left) fraction of gross financial income (defined as the sum of interest, dividend, and rental income) of individual i, I_τ is a fiscal year dummy, $I_{20\ to\ 39}$, $I_{40\ to\ 59}$ and I_{60+} denote dummies equal to one if the individual is between 20 and 39 years old, 40 to 59 years old or 60 years old or older, X_i is a vector of controls, including gender, partner status and occupation category, and η_l is a location fixed effect, based on the area of residence (see Section 2) of individual i. Standard errors are double-clustered by area of residence and fiscal year.

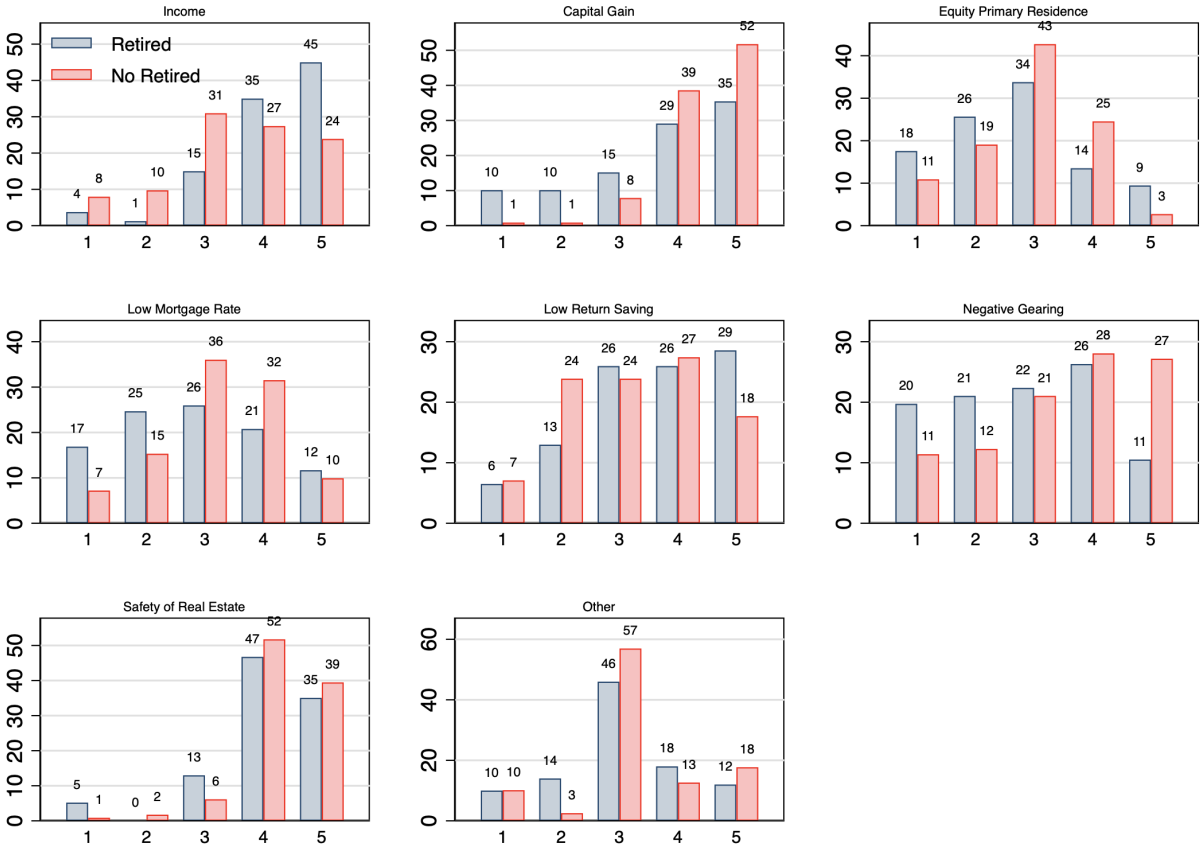


Figure 8: The figure displays the distribution of responses from the ALA Survey (see Section 5) for the questions asking to evaluate the importance of different motivations for purchasing a rental property (Q3 in section 1 of the survey, see Section B in the Appendix). The sample is restricted to landlords who purchased their rental property (or properties) between 2006 and 2019. We report results separately for landlords who are and are not retirees.

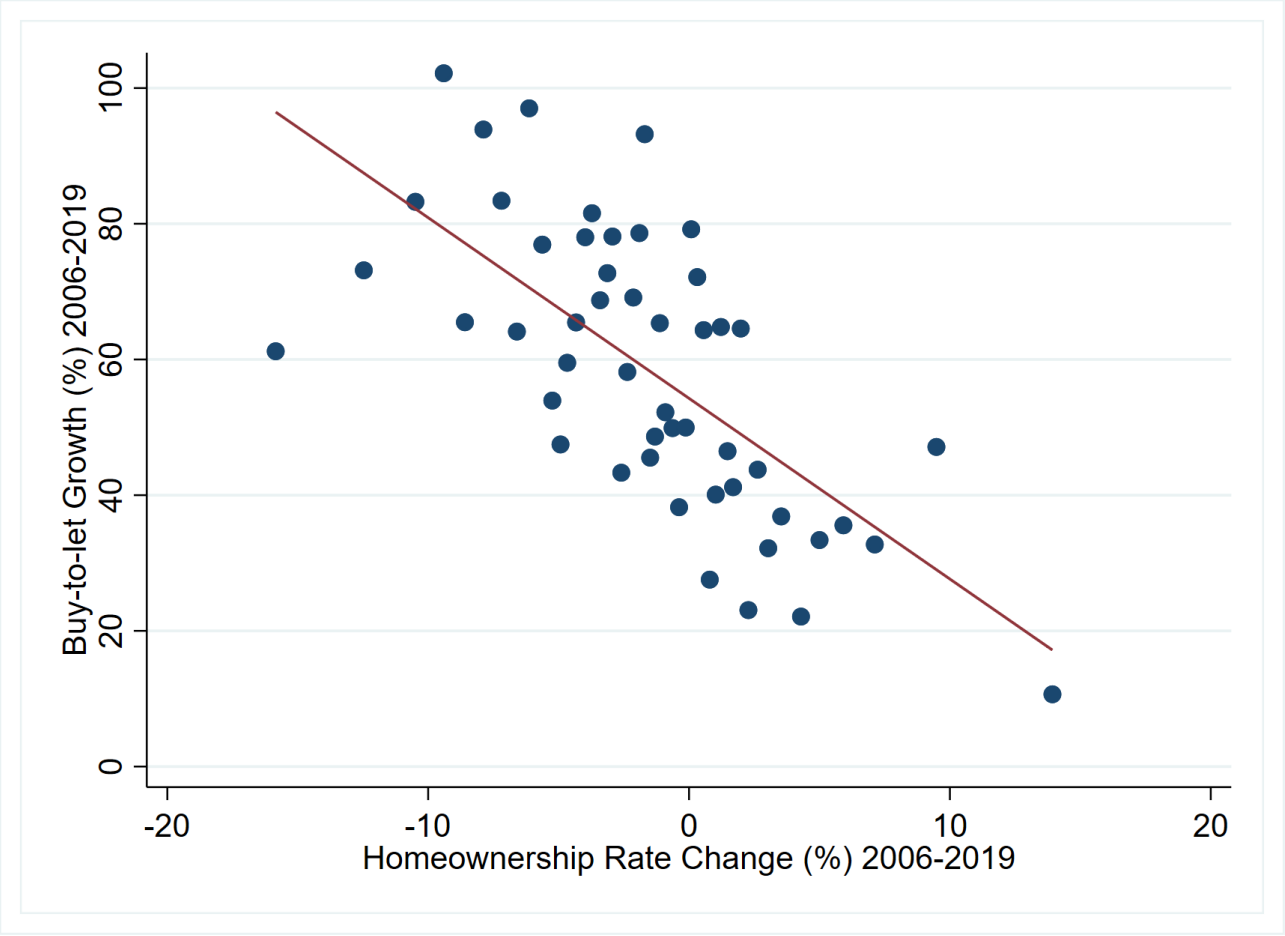


Figure 9: The figure displays a binned scatter plot documenting the association between changes in buy-to-let activity and changes in the homeownership rate, at the postcode level. The y-axis is the percentage growth in the volume of buy-to-let transactions between 2006 and 2019. The x-axis is the change in the homeownership rate between 2006 and 2019.

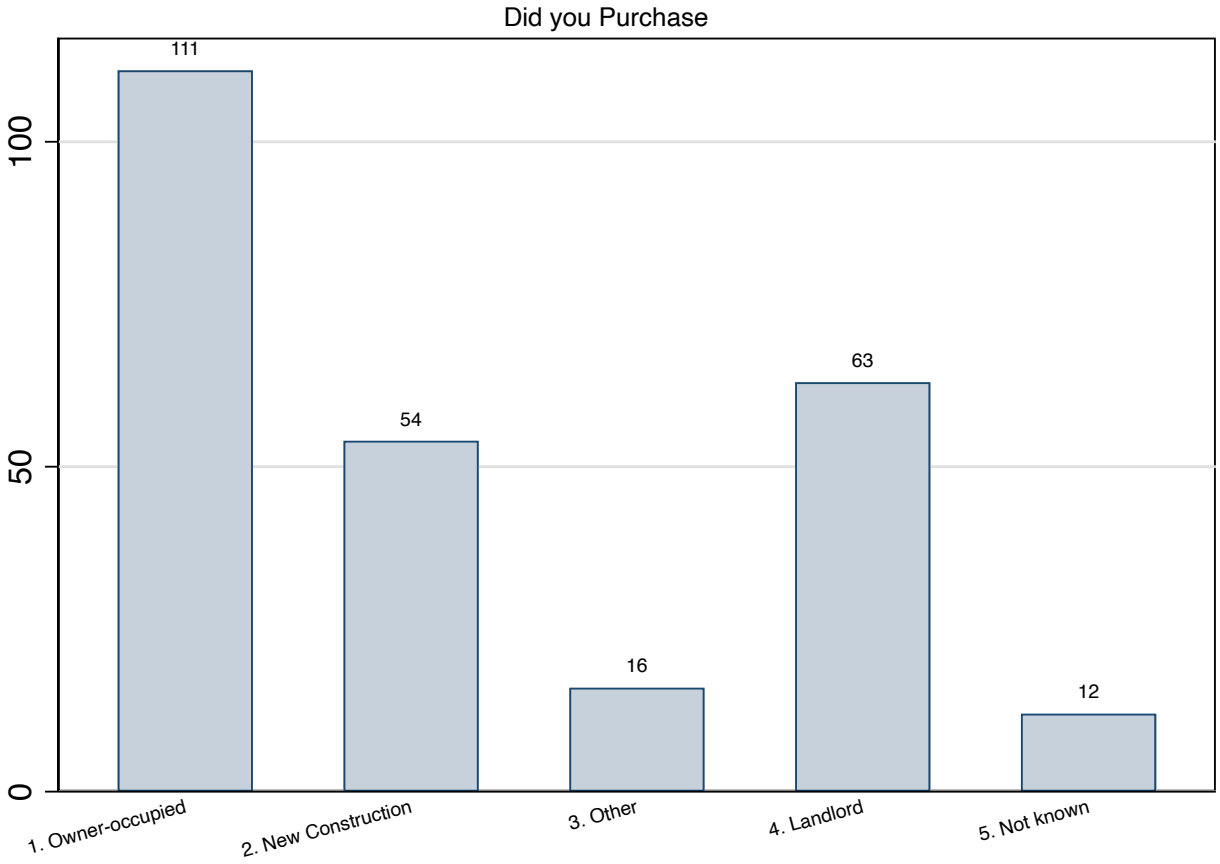


Figure 10: The figure displays the distribution of responses in the ALA survey (see Section 5) to a question asking who did a landlord purchase her property from (Q7 in section 3 of the survey, see Section B in the Appendix). The sample is restricted to landlords who purchased their rental property (or properties) between 2006 and 2019.

Table 1: **Summary Statistics**

Panel A: Non Financial Income

	Avg	Std	1st	10th	25th	50th	75th	90th	99th
Salary	49.26	57.04	0	0	5.67	40.12	71.44	107.31	239.40
Pension	1.86	7.56	0	0	0	0	0	4.85	35.48
Business	9.79	688.62	0	0	0	0	0	0	169.45
Trust	4.68	36.07	0	0	0	0	0	1.03	102.95
Other	2.19	22.95	0	0	0	0	0	1.05	45.84

Panel B: Financial Income

	Avg	Std	1st	10th	25th	50th	75th	90th	99th
Rental	3.13	12.79	0	0	0	0	0	10.03	50.69
Dividends	1.88	24.65	0	0	0	0	0	0.82	37.44
Interest	1.08	5.49	0	0	0	0	0.22	1.90	20.40
Capital Gains	3.50	67.35	0	0	0	0	0	0	56.81
Total	77.36	697.54	0.04	13.84	29.32	53.59	87.91	137.68	412.36

This table reports summary statistics for the individual tax filings in our sample. All variables are expressed in terms of 2019 Australian Dollar (in thousands). For each variable, we report the mean, standard deviation, and the $1st$, $10th$, $25th$, $50th$, $75th$, $90th$ and $99th$ percentiles. *Salary* includes salary or wages (income item 1 of the tax form) plus allowances (item 2) and employment termination payments (item 3); *Pension* includes government pensions and allowances (item 6 of the tax form), plus annuities and superannuation income streams (item 7); *Business* includes the sum of income from primary (item P8, sum of labels C, E, N, G and I) and non-primary production (item P8, sum of labels D, B, F, O, H and J); *Trust* represents the sum of income from partnerships and trusts (item 13); *Other* represents the sum of foreign income (item 20, label M) and other sources of income; *Rental* represents gross rental income (item 21, label P); *Dividends* represents total dividends received, including unfranked (item 11, label S) and franked amounts (item 11, label T); *Interest* represents gross interest amount earned (item 10); *Capital Gains* represents total capital gains (item 18, label H).

Table 2: **Fraction of Landlords and Rates**

	(1)	(2)	(3)
CD_{6m}	-0.614***		
	(-10.30)		
$Bond_{2yr}$		-0.705***	
		(-10.26)	
$Bond_{10yr}$			-0.894***
			(-6.80)
Postcode HP	-0.006***	-0.006***	-0.008***
	(-3.21)	(-3.23)	(-3.42)
Mtg Credit Spread	0.428***	0.158	-0.164
	(3.71)	(1.15)	(-0.67)
Stock Div Yld	-1.549***	-1.643***	-1.431***
	(-5.09)	(-5.43)	(-3.44)
Stock Mkt Ret	-0.015*	-0.012	-0.016
	(-1.97)	(-1.47)	(-1.58)
Bus Cond Index	-0.004	-0.007	-0.013
	(-0.27)	(-0.54)	(-0.61)
Postcode Pop.	-0.026***	-0.028***	-0.032**
	(-4.17)	(-4.34)	(-4.07)
Postcode FE	YES	YES	YES
R^2_{adj}	0.907	0.907	0.901
N	30,690	30,690	30,690

This table reports estimates of the coefficients from regression equation:

$$FracLL_{i,t} = \gamma y_t + \mathcal{B}X_{i,t} + \alpha_i + e_{i,t}$$

where $FracLL_{i,t}$ is the share of landlords (out of all tax-filing residents) in postcode i in fiscal year t; y_t is either the rate on 6-month CDs issued by Australian banks, or the yield on the 2-year or the 10-year Australian Government Bonds; α_i is a postcode fixed effect and $X_{i,t}$ is a vector of controls, including Stock Div Yld , the stock market dividend yield in year t; Stock Mkt Ret, the stock market return over year t; Bus Cond Index, the average value in year t of the Business Conditions Index published by the Australian Bureau of Statistics; Mtg Credit Spread, the mortgage credit spread in year t; Postcode Population, the growth in the number of residents in postcode i, between year $t-1$ and t and Postcode HP, the log house price growth in postcode i between year $t-1$ and t. Standard errors are double clustered by fiscal year and postcode.

Table 3: **Investment Activity and Rates**

	(1)	(2)	(3)
	Panel A: Buy-to-Let		
CD_{6m}	-1.574***		
	(-6.31)		
$Bond_{2yr}$		-1.778***	
		(-6.04)	
$Bond_{10yr}$			-2.176***
			(-4.47)
Controls	YES	YES	YES
Postcode FE	YES	YES	YES
R^2_{adj}	0.625	0.619	0.598
N	17,916	17,916	17,916
	Panel B: Buy-to-Resell (House Flipping)		
CD_{6m}	0.185**		
	(2.22)		
$Bond_{2yr}$		0.231**	
		(2.45)	
$Bond_{10yr}$			0.337**
			(2.42)
Controls	YES	YES	YES
Postcode FE	YES	YES	YES
R^2_{adj}	0.145	0.146	0.147
N	17,916	17,916	17,916

This table reports estimates of the coefficients from the regression equation:

$$FracInv_{i,t} = \gamma y_t + \mathcal{B}X_{i,t} + \alpha_i + e_{i,t}$$

where $FracInv_{i,t}$ is the fraction of buy-to-let (Panel A) or buy-to-resell (Panel B) sales out of all sales in postcode i in fiscal year t. We identify a transaction as a *buy-to-let* if the property is listed for rent within 9 months from the sale. We identify it as a *buy-to-resell* if the property is either listed for sale or sold within 9 months from the sale. y_t is either the rate on 6-month CDs issued by Australian banks, or the yield on the 2-year or the 10-year Australian Government Bonds; α_i is a postcode fixed effect and $X_{i,t}$ is a vector of controls, including Stock Div Yld , the stock market dividend yield in year t; Stock Mkt Ret, the stock market return over year t; Bus Cond Index, the average value in year t of the Business Conditions Index published by the Australian Bureau of Statistics; Mtg Credit Spread, the mortgage credit spread in year t; Postcode Population, the growth in the number of residents in postcode i, between year $t-1$ and t and Postcode HP, the log house price growth in postcode i between year $t-1$ and t. Standard errors are double clustered by fiscal year and postcode.

Table 4: **Buy-to-Let Activity at Higher Frequency: Local Projections**

			Panel A		
	$h=1$	$h=3$	$h=6$	$h=9$	$h=12$
Δr_{policy}	0.032	0.021	-0.056	-0.194***	-0.223***
	(0.55)	(0.29)	(-0.96)	(-3.35)	(-3.71)
R^2_{adj}	0.20	0.36	0.13	0.37	0.38
N	166	164	161	158	155
			Panel B		
	$h=1$	$h=3$	$h=6$	$h=9$	$h=12$
$Shock_{2Yr}$	-0.105	-0.053	-0.305**	-0.361**	-0.302**
	(-0.89)	(-0.33)	(-2.19)	(-2.12)	(-2.27)
R^2_{adj}	0.20	0.36	0.15	0.36	0.31
N	166	164	161	158	155
			Panel C		
	$h=1$	$h=3$	$h=6$	$h=9$	$h=12$
$Shock_{10Yr}$	-0.078	0.010	-0.292**	-0.455***	-0.228*
	(-0.64)	(0.06)	(-2.18)	(-3.01)	(-1.79)
R^2_{adj}	0.20	0.36	0.14	0.37	-0.38
N	166	164	161	158	155

This table reports estimates of the coefficients from the regression equations:

$$\Delta log(BuyToLet)_{t+h} = \alpha + \Delta r_{t\to t-2} + \sum_{\ell=1}^{2} \Delta log(BuyToLet)_{t-\ell+1} + e_{t+h} \qquad \textit{Panel A}$$

$$\Delta log(BuyToLet)_{t+h} = \alpha + s_{t\to t-2} + \sum_{\ell=1}^{2} \Delta log(BuyToLet)_{t-\ell+1} + e_{t+h} \qquad \textit{Panel B \& C}$$

where $BuyToLet$ denotes the number of buy-to-let transactions in month t; r denotes the Australian monetary policy rate and s_t is the shock to rates around policy announcements for the 2-year bond (Panel B) or for the 10-year bond (Panel C).

Table 5: **Differences Across Locations**

	(1)	(2)	(3)	(4)	(5)	(6)
	Fraction of Landlords			Fraction Buy-to-Lease		
$CD_{6m} \times Senior_{2005}$	-1.250***					
	(-5.60)					
$Bond_{2yr} \times Senior_{2005}$		-1.331***				
		(-6.27)				
$Bond_{10yr} \times Senior_{2005}$			-1.585***			
			(-7.02)			
$CD_{6m} \times RY_{2005}$				-0.535***		
				(-2.74)		
$Bond_{2yr} \times RY_{2005}$					-0.583***	
					(-2.85)	
$Bond_{10yr} \times RY_{2005}$						-0.748***
						(-2.99)
Other Controls	YES	YES	YES	YES	YES	YES
R^2_{adj}	0.91	0.91	0.91	0.57	0.57	0.57
N	30507	30507	30507	17540	17540	17540

This table reports estimates of the coefficients from the regression equations:

$$FracLL_{i,t} = \gamma_{y,Senior}\left(y_t \times \phi_{Senior2005,i}\right) + \mathcal{B}_X X_{i,t} + \alpha_t + \alpha_i + u_{i,t} \quad Columns\ 1\ to\ 3$$
$$FracBuyToLet_{i,t} = \gamma_{y,RY}\left(y_t \times RY_{2005,i}\right) + \mathcal{B}_X X_{i,t} + \alpha_t + \alpha_i + e_{i,t} \quad Columns\ 4\ to\ 6$$

where $FracLL_{i,t}$ is the share of landlords (out of all residents) in postcode i and fiscal year t; $FracBuyToLet_{i,t}$ is, out of all properties purchased in postcode i in year t, the fraction of properties re-listed as rentals within 9 months; y_t is either the rate on 6-month CDs issued by Australian banks, or the yield on the 2-year or the 10-year Australian Government Bonds; $\phi_{Senior2005,i}$ is the fraction of individual with age greater or equal than 40 in postcode i in 2005; $RY_{2005,i}$ is the average rental yield, in percentage, for postcode i between 2000 and 2005; α_i and α_t are postcode and year fixed effect and $X_{i,t}$ is a vector of controls, including the growth in house prices and in the number of residents in postcode i between year $t-1$ and t. Standard errors are double clustered by fiscal year and postcode

Table 6: **Survey Motives for Purchasing Rental Properties: Tests**

	H_o **Retired=Not Retired**		H_o **Income = Others** *Not Retired*		H_o **Income = Others** *Retired*	
Motive	T-stat	P-value	T-stat	P-value	T-stat	P-value
Income	4.127***	0.000				
Capital Gains	-3.653***	0.000	-6.146***	0.000	2.084**	0.037
Negative Gearing	-3.116***	0.002	-0.215	0.830	6.198***	0.000
Equity From Residence	-1.429	0.153	4.081***	0.000	7.116***	0.000
Low Mortgage Rate	-2.169**	0.030	1.877*	0.060	6.416***	0.000
Low Return on Saving	1.892*	0.058	1.610	0.107	3.21***	0.001
Safety Real Estate	-1.410	0.158	-5.312***	0.000	0.927	0.354
Other	-0.907	0.364	1.699*	0.089	5.476***	0.000

This table reports statistics based on the Wilcoxon non-parametric test (Wilcoxon, 1945). We split the sample in two groups, depending on whether the respondent is or is not a retiree (based on the answer to Q1 in Section 3 of the survey, see Appendix B). Columns 1 and 2 report t-stats and p-values for tests of the null that the distribution of scores for each motive is equal across the two groups of respondents. Columns 3 and 4 (5 and 6), report t-stats and p-values for tests of the null that the distribution of scores for the income motive is equal to that of each of the other motives, within each group of respondents (retirees or non-retirees).

Table 7: **Buy-to-Let Activity and Homeownership**

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: OLS			**Panel B: Logit**		
CD_{6m}	-0.338*			-2.824***		
	(-1.66)			(-3.49)		
				[-0.702]		
$Bond_{2yr}$		-0.507**			-3.642***	
		(-2.48)			(-4.66)	
					[-0.906]	
$Bond_{10yr}$			-0.387*			-3.322***
			(-1.67)			(-3.73)
						[-0.825]
Controls	YES	YES	YES	YES	YES	YES
Postcode FE	YES	YES	YES	YES	YES	YES
Year-Month FE	YES	YES	YES	YES	YES	YES
R^2_{adj}	0.024	0.024	0.024	0.014	0.02	0.017
N	276163	276163	276163	276191	276191	276191

This table reports estimates of the coefficients from the regression equation:

$$\mathbb{1}(Owner\_Occupied)_i = \beta y_t + \mathcal{B}_X X_{p(i),t} + \alpha_{p(i)} + \tau_t + \epsilon_i$$

where $\mathbb{1}(Owner\_Occupied)_i$ is a variable equal to 1 if the buy-to-let property transacted at time t was previously owner-occupied; y_t is either the rate on 6-month CDs issued by Australian banks, or the yield on the 2-year or the 10-year Australian Government Bonds; $X_{p(i),t}$ is a vector of controls for postcode p where property i is located, including price growth between month t - 12 and month t, rent growth between month t - 12 and month t, population growth between month t - 12 and month t, and growth in number of listings between month t - 12 and month t; α_p is a postcode fixed effect, and τ_t is a month fixed effect. Estimates in Panel A are based on a linear specification while in Panel B are based on a Logit model. In Panel B we report average marginal effects in squared brackets. Standard errors are double clustered by year-month and postcode.

Table 8: **Effects of Local Shocks: Evidence from Western Australia**

	(1)	(2)	(3)	(4)	(5)
	Panel A: Middle Age (40-59)				
	Rent	Dividend	Interest	Salary/Pension	Total
Iron Ore	0.226***	0.011	0.011	0.065***	0.065***
	(6.14)	(0.24)	(0.07)	(3.23)	(4.84)
Iron Ore $\times I(Landlord)$					0.063***
					(4.66)
$I(Landlord)$					0.214***
					(3.57)
Controls	YES	YES	YES	YES	YES
R^2_{adj}	0.057	0.032	0.045	0.213	0.224
N	18110	19858	42604	68735	81428
	Panel B: Retirement Age (60+)				
	Rent	Dividend	Interest	Salary/Pension	Total
Iron Ore	0.269***	-0.036	0.179	-0.016	-0.082
	(5.87)	(-0.80)	(1.08)	(-0.54)	(-1.58)
Iron Ore $\times I(Landlord)$					0.173***
					(5.32)
$I(Landlord)$					-0.046
					(-0.31)
Controls	YES	YES	YES	YES	YES
R^2_{adj}	0.044	0.055	0.089	0.216	0.183
N	6580	15763	24521	22521	33678

This table reports estimates of the coefficients from the following two regression equations:

$$\log(Inc_{i,t}) = b_1 log(P_{IO,t-1}) + BX_i + \alpha_t + e_i \qquad Columns\ 1\ to\ 4$$
$$\log(Inc_{i,t}) = b_1 log(P_{IO,t-1}) + b_2\left(log(P_{IO}) \times I(Landlord_i)\right) + b_3 I(Landlord_i) + BX_i + \alpha_t + u_i\ Column\ 5$$

where $\log(Inc_{i,t})$ is either log gross rental income, log dividends, log interest income, log salary or pension, or log total income for individual i in fiscal year t, $P_{IO,t-1}$ is the price of iron ore in fiscal year $t-1$, $I(Landlord_i)$ is a dummy equal to one if individual i in fiscal year t is a landlord, and α_t is a fiscal year fixed effect. The vector of controls X_i includes age, partner status, occupation codes, and gender (see Section 2). The sample is restricted to individuals with residence in Perth, the capital of the state of Western Australia, and to tax filings for years from 2004 to 2019. Standard errors are clustered by year.

Appendix for Online Publication:

Individual Investors' Housing Income and Interest Rates Fluctuations

A Additional Figures and Tables

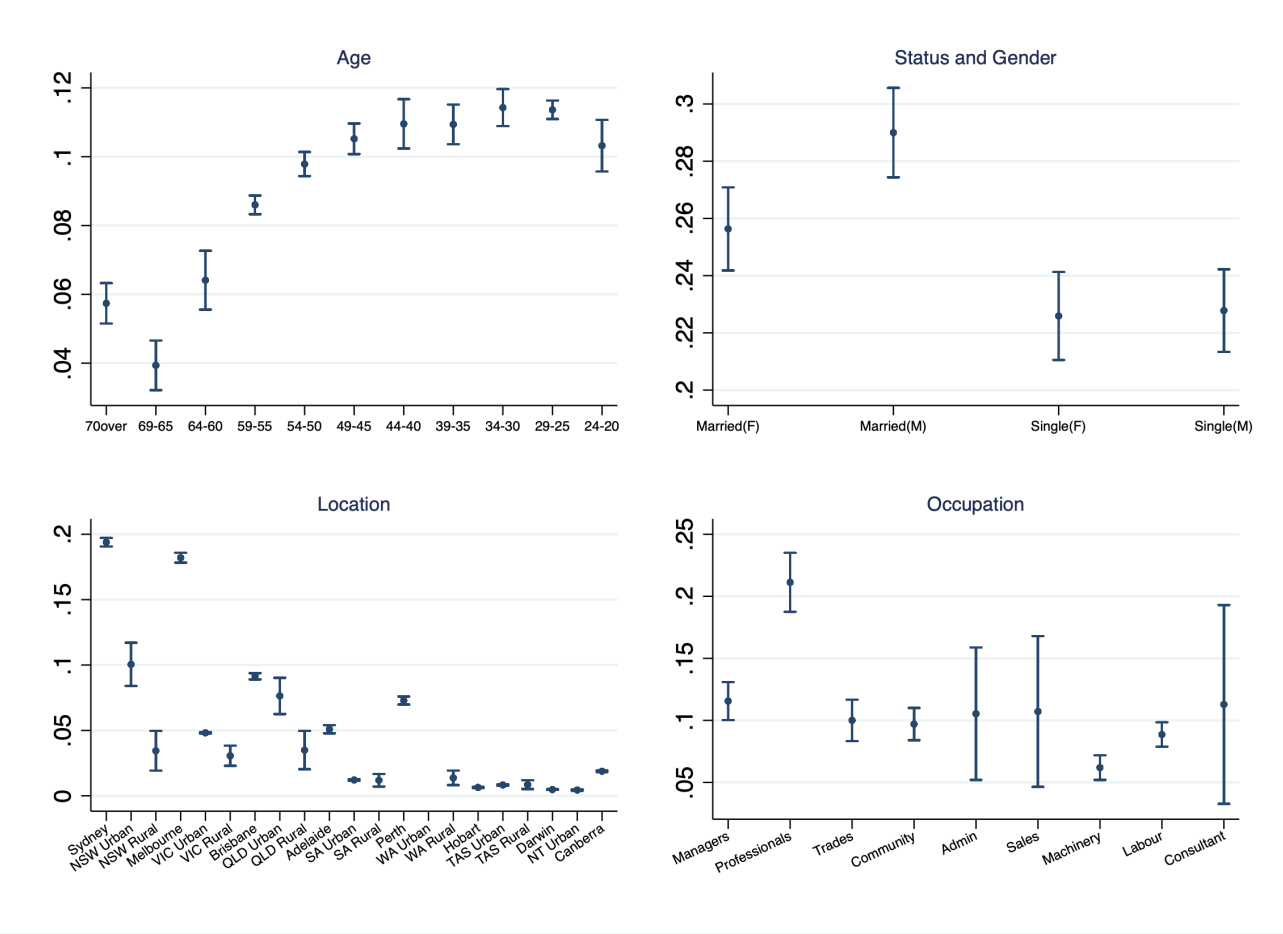


Figure A.1: The figure displays the distribution of demographic characteristics within the ATO individual tax filings. We display age, marital status and gender, location, and occupation. For each year we compute the fraction of individuals in a given age (top-left), status and gender (top-right), location (bottom-left) and occupation (bottom-right) group. We then the report means across years and standard error bars.

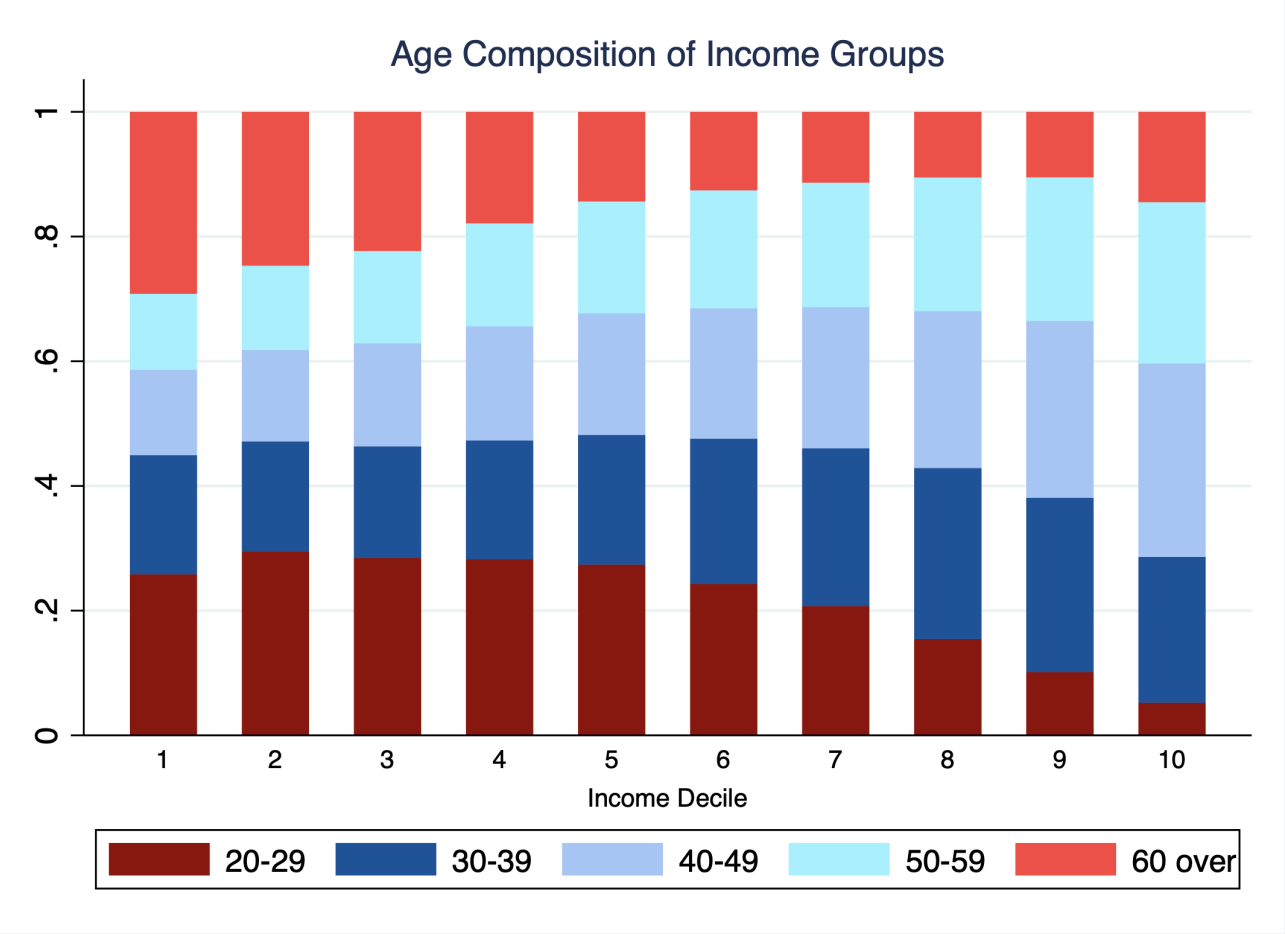
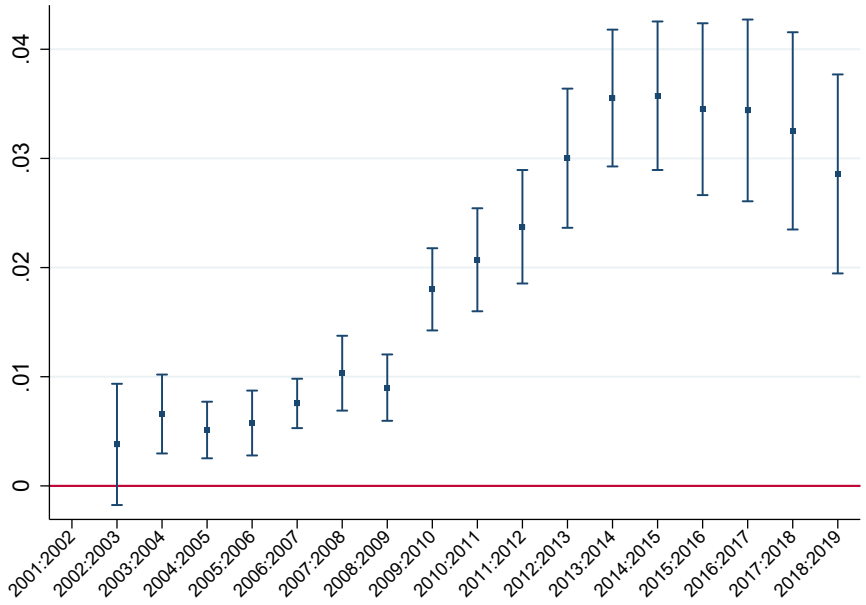
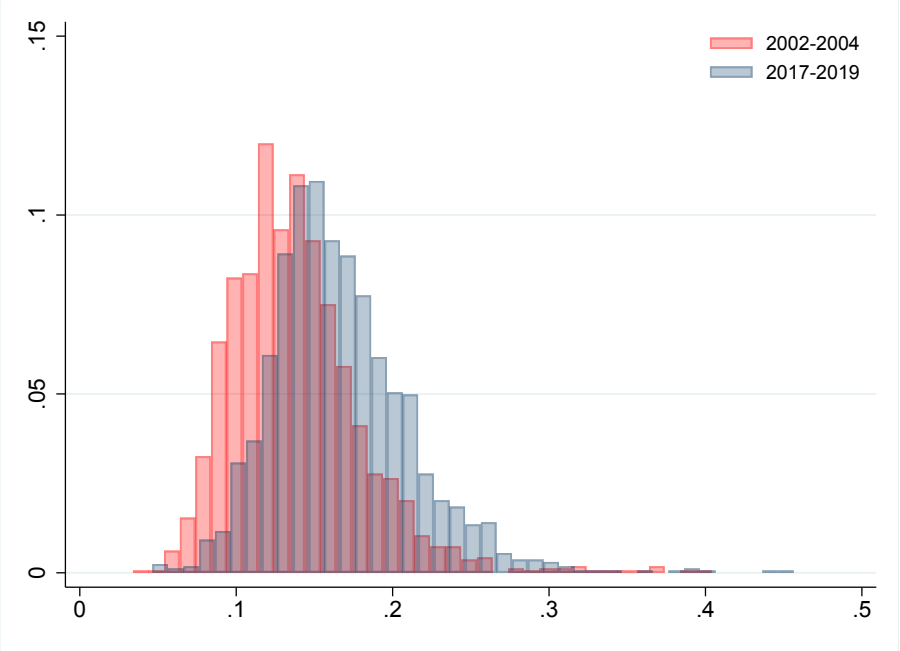


Figure A.2: This figure displays age composition across income deciles for the ATO individual tax filings dataset.



(a) Share of Landlords: Time-Series

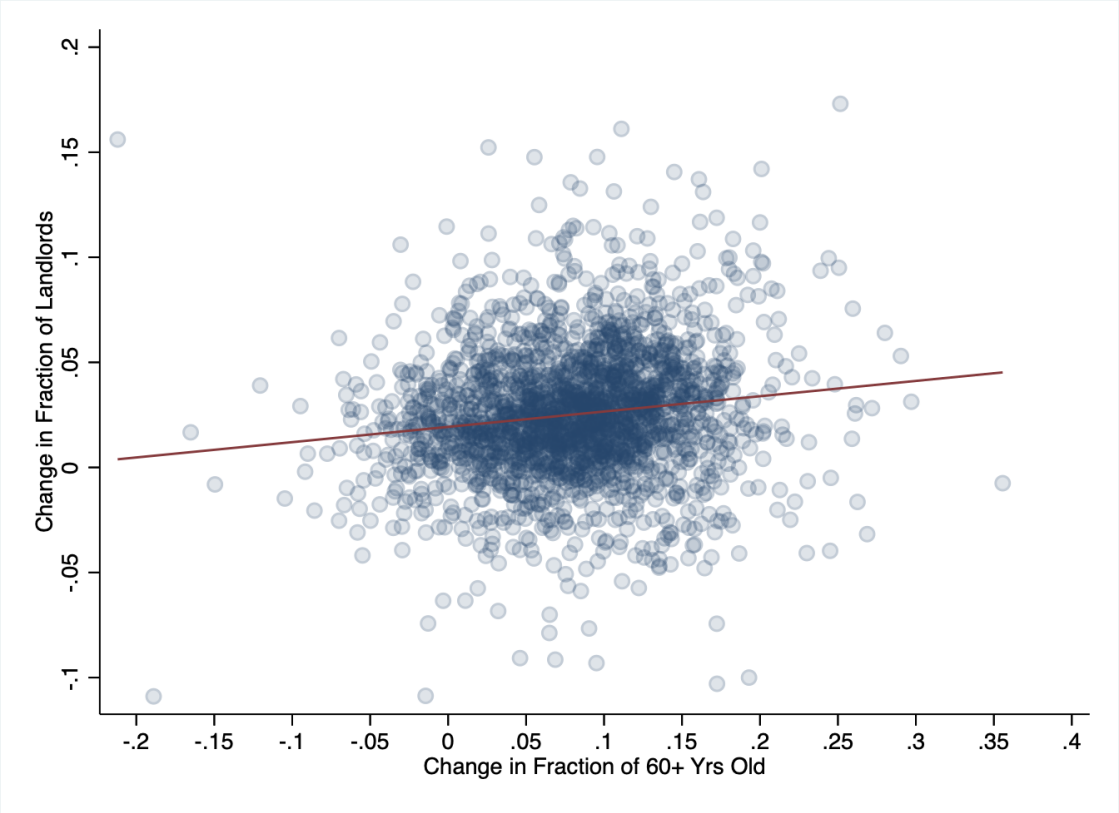


(b) Share of Landlords by Postcode (2015:2019 vs 2003:2007)

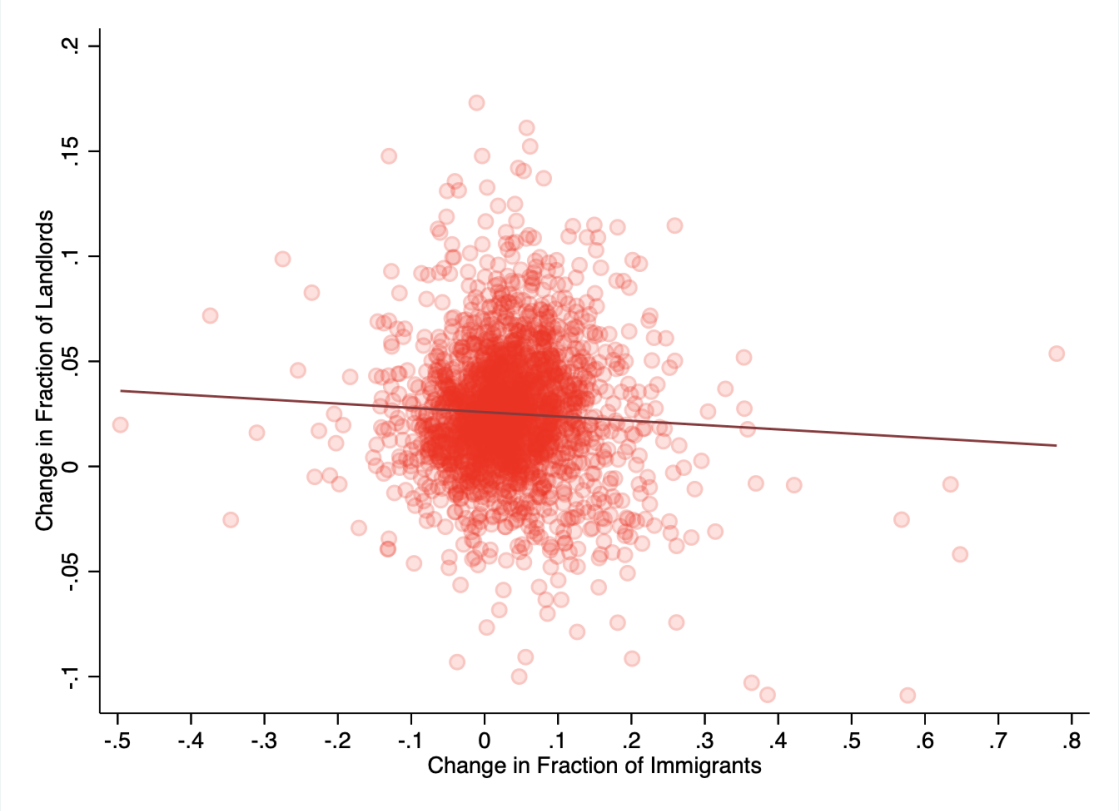
Figure A.3: Panel (a) shows estimates of the coefficients δ_t from the following regression equation:

$$y_{j,t} = \sum_{t=2003}^{2019} \delta_t + \mathcal{B}X_{j,t} + \alpha_j + e_{j,t},$$

where $y_{j,t}$ is the share of landlords in postcode j and year t. Results are based on tax filings for the entire Australian population, aggregated at the postcode level. Panel (b) shows the distribution of the fraction of landlords across postcodes for the years from 2002 to 2004 (red bars), and from 2017 to 2019 (blue bars).



(a) Δ 60+ Yrs Old and Δ Landlords ($R^2 = 2.12\%$)



(b) Δ Immigrants and Δ Landlords ($R^2 = 0.14\%$)

Figure A.4: The figure shows the postcode-level relationship between the change in the fraction of landlords from 2003-2005 to 2017-2019, and the change in the fraction of 60+ years old individuals (panel a) and the fraction of immigrants (panel b) between 2006 and 2019. Data on residents' age and immigration status are available from the Australian Bureau of Statistics.

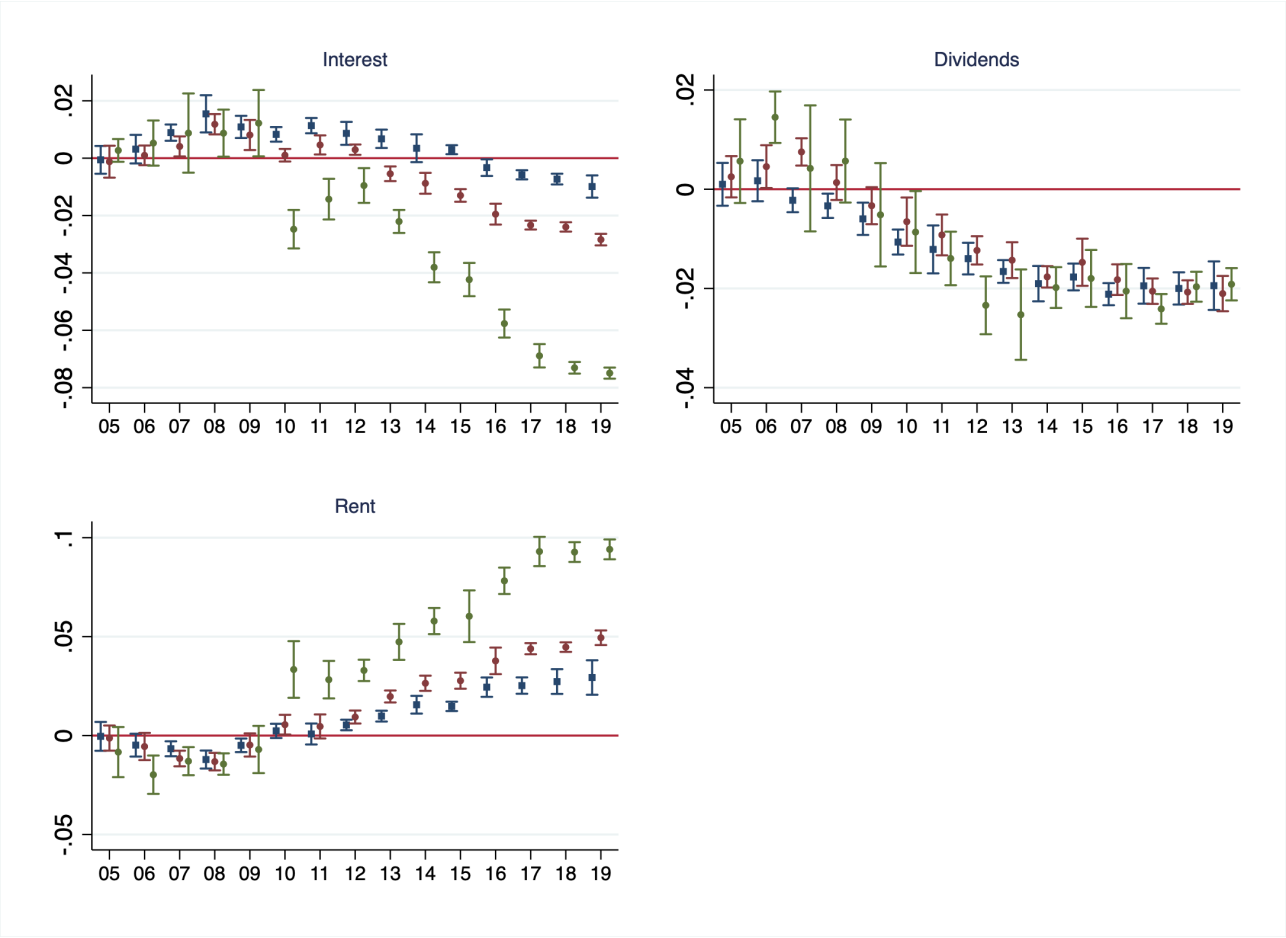


Figure A.5: The figure displays estimates of the parameters $\delta_{\tau \times Young}$ (blue), $\delta_{\tau \times Mid}$ (red) and $\delta_{\tau \times Senior}$ (green) from the following regression equation, estimated on data from individual tax filings data for landlords only:

$$y_i = \sum_{\tau=2005}^{2019} \delta_{\tau \times Young}\Big(I_\tau \times I_{20\ to\ 39}\Big) + \sum_{\tau=2005}^{2019} \delta_{\tau \times Mid}\Big(I_\tau \times I_{40\ to\ 60}\Big) + \sum_{\tau=2005}^{2019} \delta_{\tau \times Senior}\Big(I_\tau \times I_{60+}\Big) + \\ + \alpha I_{20\ to\ 39} + \beta I_{40\ to\ 60} + \mathcal{B}X_i + \eta_l + e_i$$

where y_i is either the interest (top left), dividend (top right) or rental (bottom left) fraction of gross financial income (defined as the sum of interst, dividend, and rental income) of individual i, I_τ is a fiscal year dummy, $I_{20\ to\ 39}$, $I_{40\ to\ 59}$ and I_{60+} denote dummies equal to one if the individual is between 20 and 39 years old, 40 to 59 years old or 60 years old or older, X_i is a vector of controls, including gender, partner status and occupation category, and η_l is a location fixed effect, based on the area of residence (see Section 2) of individual i. Standard errors are double-clustered by postcode and year.

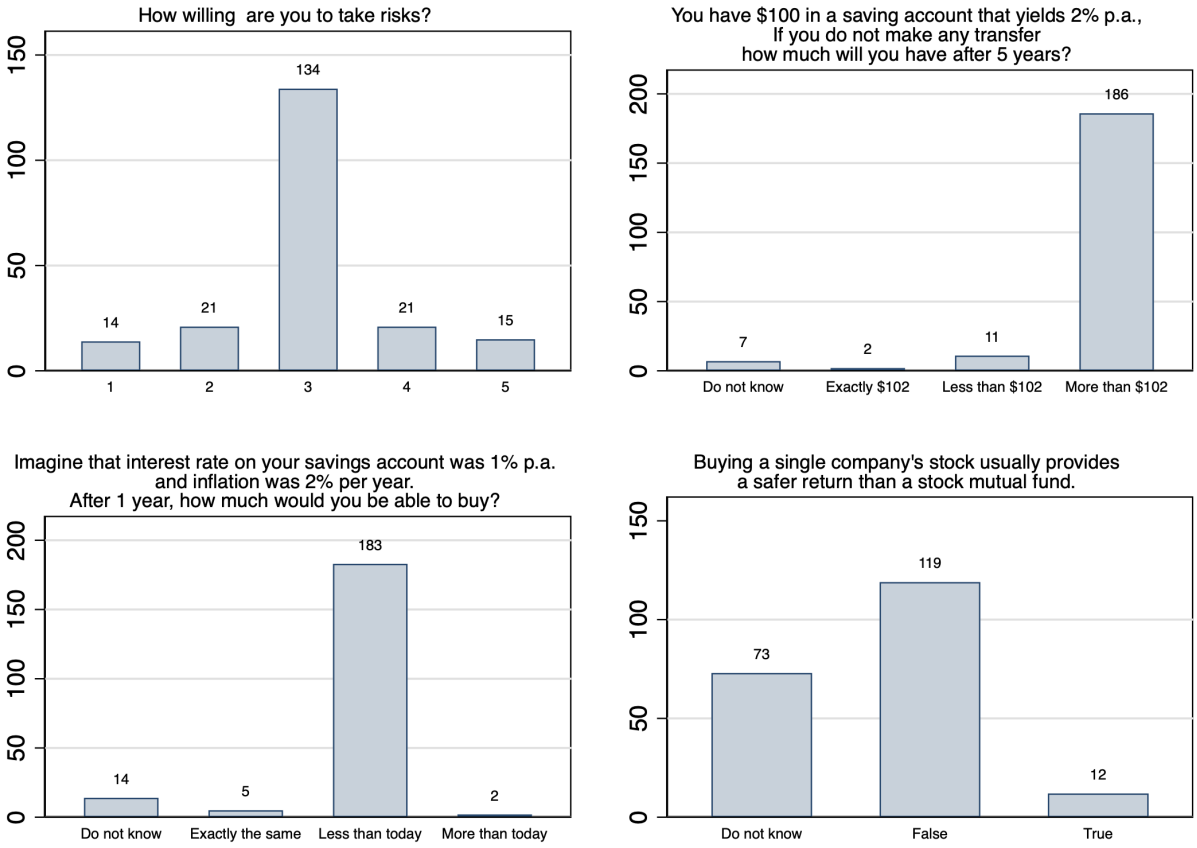


Figure A.6: The figure shows answers to risk preferences and financial literacy questions from the ALA Survey (Q1 to Q4 in Section 2 of the Survey, see Appendix B), for respondents who bought their rental properties between 2006 and 2019.

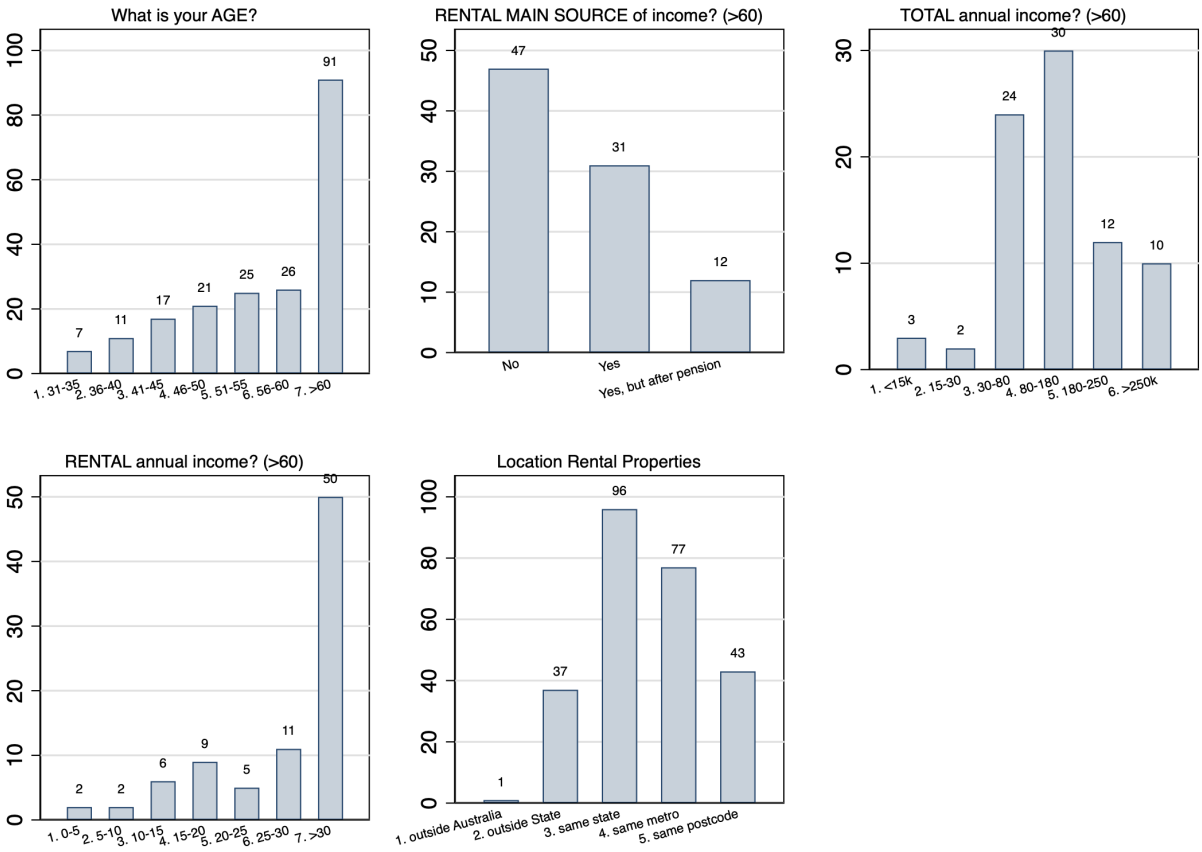


Figure A.7: The figure shows answers to questions on landlord characteristics from the ALA Survey (Q1 to Q6 in Section 3 of the Survey, see Appendix B), for respondents who bought their rental properties between 2006 and 2019.

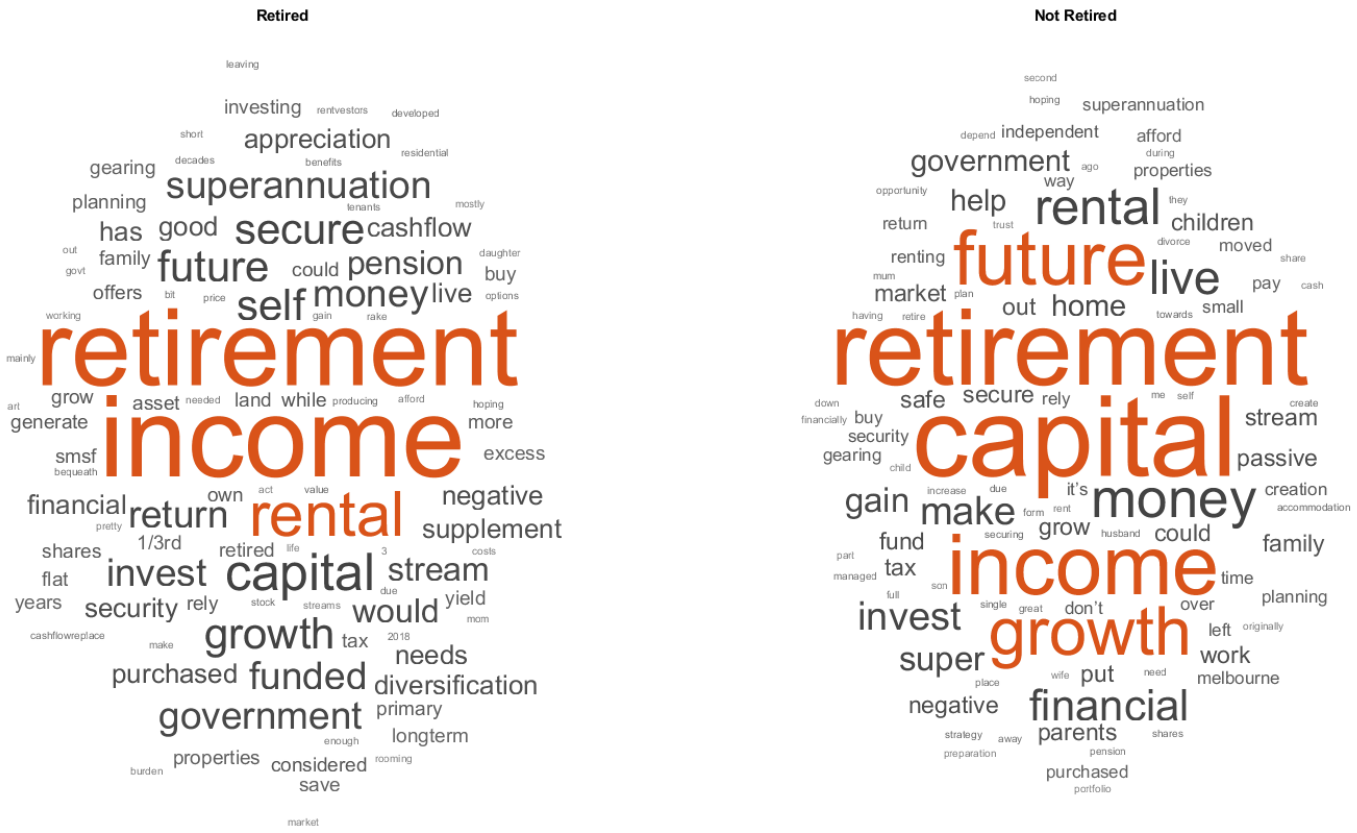


Figure A.8: The figure shows word clouds summarizing keywords in the answers to the open question on the reason for buying a rental property, in the ALA Survey (Q2 in Section 1 of the Survey, see Appendix B). We report two separate word maps, for respondents who are (left) and are not (right) retirees. The sample is restricted to those who bought their rental properties between 2006 and 2019.

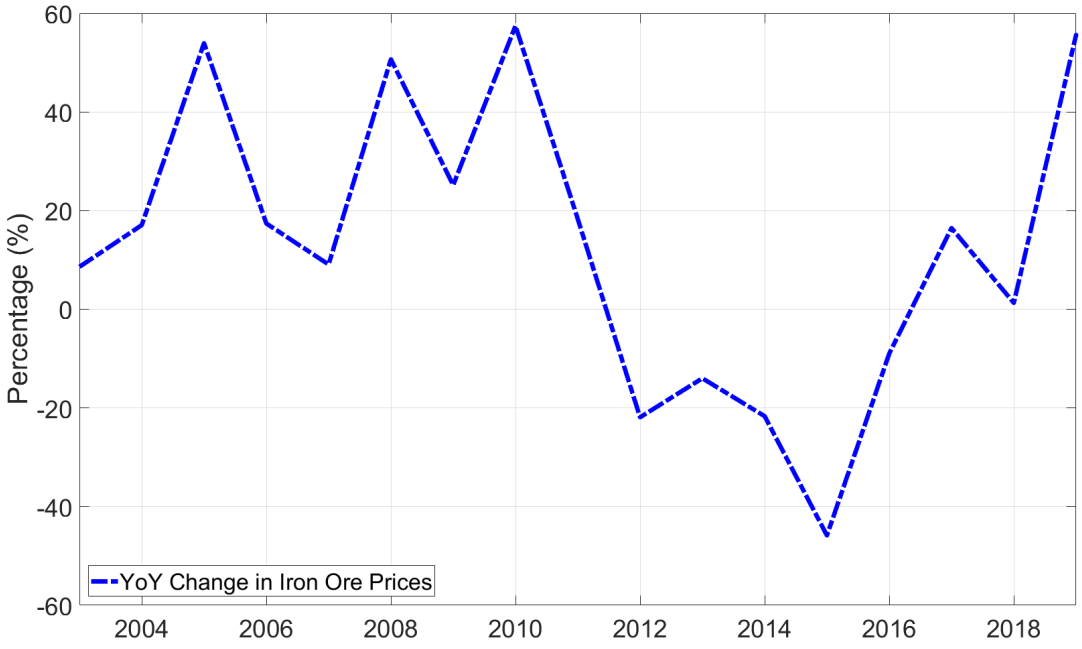


Figure A.9: The figure reports year-over-year percentage changes in iron ore prices (in year t, this is the change between year $t-1$ and t). Years are aligned with Australian fiscal years, and so begin in July and end in June. Iron ore prices are spot prices for shipments with 62% Fe content to Chinese ports (specifically, the CFR Tianjin port), and are quoted in terms of US Dollars per metric ton.

Table A.1: **Summary Statistics**

Panel A: New South Wales

	Avg	Std	1st	10th	25th	50th	75th	90th	99th
Price	612.26	798.11	0.00	185.00	300.00	460.00	710.00	1,120.00	3,000.00
Rent	2.07	1.16	0.65	1.08	1.43	1.82	2.38	3.20	6.49
Bedrooms	2.82	1.08	1.00	2.00	2.00	3.00	3.00	4.00	6.00
Bathrooms	1.51	0.70	1.00	1.00	1.00	1.00	2.00	2.00	4.00
Car spaces	1.58	1.01	1.00	1.00	1.00	1.00	2.00	2.00	5.00

Panel B: Victoria

	Avg	Std	1st	10th	25th	50th	75th	90th	99th
Price	448.65	586.64	0.00	0.00	200.00	355.00	559.80	850.00	2,260.00
Rent	1.67	0.84	0.63	0.97	1.21	1.52	1.91	2.47	4.76
Bedrooms	2.80	0.98	1.00	2.00	2.00	3.00	3.00	4.00	5.00
Bathrooms	1.49	0.62	1.00	1.00	1.00	1.00	2.00	2.00	3.00
Car spaces	1.69	1.00	1.00	1.00	1.00	2.00	2.00	2.00	5.00

Panel C: Western Australia

	Avg	Std	1st	10th	25th	50th	75th	90th	99th
Price	459.68	444.25	55.00	173.00	260.00	385.00	540.00	775.00	1,850.00
Rent	1.79	0.91	0.69	1.08	1.30	1.60	1.95	2.60	5.61
Bedrooms	2.79	1.33	0.00	0.00	2.00	3.00	4.00	4.00	5.00
Bathrooms	1.61	0.61	1.00	1.00	1.00	2.00	2.00	2.00	3.00
Car spaces	1.70	0.94	1.00	1.00	1.00	2.00	2.00	2.00	4.00

This table reports summary statistics for the characteristics of properties in the sales and rental listings data provided by Corelogic. For each characteristic, we report the mean, standard deviation, and the $1st$, $10th$, $25th$, $50th$, $75th$, $90th$ and $99th$ percentiles. *Price* is the sale price (in AUD thousands); *Rent* is the monthly asked rent (in AUD thousands); *Bedrooms*, *Bathrooms* and *Car spaces* are the number of bedrooms, the number of bathrooms and car spaces.

Table A.2: **Fraction of Landlords and Rates: Urban Areas**

	(1)	(2)	(3)
CD_{6m}	-0.581***		
	(-10.52)		
$Bond_{2yr}$		-0.668***	
		(-10.62)	
$Bond_{10yr}$			-0.854***
			(-7.16)
Postcode HP	-0.010**	-0.010**	-0.011***
	(-2.84)	(-2.85)	(-3.01)
Mtg Credit Spread	0.375***	0.119	-0.198
	(3.35)	(0.91)	(-0.87)
Stock Div Yld	-1.567***	-1.659***	-1.482***
	(-5.66)	(-6.06)	(-3.96)
Stock Mkt Ret	-0.013*	-0.010	-0.015
	(-1.93)	(-1.42)	(-1.62)
Bus Cond Index	-0.001	-0.005	-0.010
	(-0.12)	(-0.42)	(-0.55)
Postcode Pop	-0.032***	-0.034***	-0.040***
	(-4.45)	(-4.85)	(-4.87)
Postcode FE	YES	YES	YES
R^2_{adj}	0.927	0.927	0.911
N	20,052	20,052	20,052

This table reports estimates of the coefficients from the regression equation:

$$FracLL_{i,t} = \gamma y_t + \mathcal{B}X_{i,t} + \alpha_i + e_{i,t}$$

where $FracLL_{i,t}$ is the share of landlords (out of all resident tax filers) in postcode i and fiscal year t; $Yield_t$ is either the rate on 6-month CDs issued by Australian banks, or the yield on the 2-year or the 10-year Australian Government Bonds; α_i is a postcode fixed effect and $X_{i,t}$ is a vector of controls, including Stock Div Yld , the stock market dividend yield in year t; Stock Mkt Ret, the stock market return over year t; Bus Cond Index, the average value in year t of the Business Conditions Index published by the Australian Bureau of Statistics; Mtg Credit Spread, the mortgage credit spread in year t; Postcode Population, the growth in the number of residents in postcode i, between year $t-1$ and t and Postcode HP, the log house price growth in postcode i between year $t-1$ and t. Standard errors are double clustered by fiscal year and postcode.

Table A.3: **Investment Activity and Rates: Urban Areas**

	(1)	(2)	(3)
	Panel A: Buy to Lease		
CD_{6m}	-1.759***		
	(-6.22)		
$Bond_{2yr}$		-1.984***	
		(-5.98)	
$Bond_{10yr}$			-2.427***
			(-4.50)
Controls	YES	YES	YES
Postcode FE	YES	YES	YES
R^2_{adj}	0.612	0.612	0.582
N	12,024	12,024	12,024
	Panel B: Buy to Resell (Flipping)		
CD_{6m}	0.283**		
	(2.88)		
$Bond_{2yr}$		0.346***	
		(3.13)	
$Bond_{10yr}$			0.491***
			(3.40)
Controls	YES	YES	YES
Postcode FE	YES	YES	YES
R^2_{adj}	0.172	0.173	0.176
N	12,024	12,024	12,024

This table reports estimates of the coefficients from the regression equation:

$$FracInv_{i,t} = \gamma y_t + \mathcal{B}X_{i,t} + \alpha_i + e_{i,t}$$

where $FracInv_{i,t}$ is the fraction of buy-to-let (Panel A) or buy-to-resell (Panel B) sales out of all sales in postcode i in fiscal year t. We identify a transaction as *buy-to-let* if the property is listed for rent within 9 months from the sale, while we identify it as *buy-to-resell* if the property is either listed for sale or sold within 9 months from the sale. y_t is either the rate on 6-month CDs issued by Australian banks, or the yield on the 2-year or the 10-year Australian Government Bonds; α_i is a postcode fixed effect and $X_{i,t}$ is a vector of controls, including Stock Div Yld , the stock market dividend yield in year t; Stock Mkt Ret, the stock market return over year t; Bus Cond Index, the average value in year t of the Business Conditions Index published by the Australian Bureau of Statistics; Mtg Credit Spread, the mortgage credit spread in year t; Postcode Population, the growth in the number of residents in postcode i, between year $t-1$ and t and Postcode HP, the log house price growth in postcode i between year $t-1$ and t. Standard errors are double clustered by fiscal year and postcode.

B Australian Landlords Association Survey Questions

We report below the questionnaire for the survey administered to a sample of members of the Australian Landlords Association between October 9 and October 30 2023.

Section 1 of 3: Motives for Purchasing a Rental Property

[Q1] Have you purchased at least one rental property between July 2006 and July 2019?

- ○ Yes
- ○ No

IF YES in Q1 is selected, show [Q2] and [Q3] below and then move to Section 2

[Q2] Why did you purchase a rental property? Describe the motives in plain words.
[Open text]

[Q3] Why did you purchase a rental property? Assess the relevance of these motives:

	Very Irrelevant	Irrelevant	Neutral	Important	Very Important
Future Capital Gains	○	○	○	○	○
Higher Equity from Primary Residence	○	○	○	○	○
Low Mortgage Rates	○	○	○	○	○
Low return on saving account	○	○	○	○	○
Additional income stream (positive gearing)	○	○	○	○	○
Negative gearing	○	○	○	○	○
Safety of Real Estate	○	○	○	○	○
Other	○	○	○	○	○

IF NO in [Q1] is selected, show [Q4] below

[Q4] Have you purchased at least one rental property

- ○ Only Before July 2006
- ○ Only After July 2019
- ○ Before July 2006 and After July 2019
- ○ I have never purchased a rental property

IF one of the first three choices in [Q4] is selected, show [Q5] and [Q6] below and then move to Section 2, otherwise, move directly to Section 2.

[Q5] Why did you purchase a rental property? Describe the motives in plain words.
[Open text]

[Q6] Why did you purchase a rental property? Assess the relevance of these motives:

	Very Irrelevant	Irrelevant	Neutral	Important	Very Important
Future Capital Gains	○	○	○	○	○
Higher Equity from Primary Residence	○	○	○	○	○
Low Mortgage Rates	○	○	○	○	○
Low return on saving account	○	○	○	○	○
Additional income stream (positive gearing)	○	○	○	○	○
Negative gearing	○	○	○	○	○
Safety of Real Estate	○	○	○	○	○

Other	○	○	○	○	○	

Section 2 of 3: Preferences and Risk Aversion

[Q1] Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- ○ More than $102
- ○ Exactly $102
- ○ Less than $102
- ○ Do not know

[Q2] Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

- ○ More than today
- ○ Exactly the same
- ○ Less than today
- ○ Do not know

[Q3] Please tell me whether this statement is true or false. *"Buying a single company's stock usually provides a safer return than a stock mutual fund."*

- ○ True
- ○ False
- ○ Do not know

[Q4] Thinking about how you allocate your investable assets, do you lean more towards risk or reward on a scale of 1 (minimum) to 5 (maximum)?

- ○ 1, I want to avoid risk at all costs, even if it means my assets won’t grow as fast as I would like
- ○ 2
- ○ 3, I try to find an even balance between risk and reward
- ○ 4
- ○ 5, I want to grow my assets as fast as possible, even if it means taking on extra financial risk

Section 3 of 3: Demographics

[Q1] Are you retired?

- ○ Yes
- ○ No
- ○ Partially

[Q2] What is your AGE?

- ○ Younger than 30
- ○ Between 31 and 35
- ○ Between 36 and 40
- ○ Between 41 and 45
- ○ Between 46 and 50
- ○ Between 51 and 55
- ○ Between 56 and 60
- ○ Older than 60

[Q3] Is rental income your main source of income?

- ○ Yes
- ○ Yes, but after pension
- ○ No

[Q4] What is your total annual income?

- ○ Between $0 and $15,000
- ○ Between $15,0001 and $30,000
- ○ Between $30,0001 and $80,000
- ○ Between $80,0001 and $180,000
- ○ Between $180,001 and $250,000
- ○ More then $250,000

[Q5] What is your rental annual income?

- ○ Between $0 and $5,000
- ○ Between $5,001 and $10,000
- ○ Between $10,001 and $15,000
- ○ Between $15,001 and $20,000
- ○ Between $20,001 and $25,000
- ○ Between $25,001 and $30,000
- ○ More than $30,000

[Q6] The rental property/ies you purchased is (are) located

- [ ] In Australia, in the same postcode where you reside
- [ ] In Australia, in the same metropolitan area where you reside
- [ ] In Australia, in the same state where you reside
- [ ] In Australia, outside the state where you reside
- [ ] Outside Australia

[Q7] Did you purchase:

- [ ] From an owner-occupied
- [ ] From a previous landlord
- [ ] A new construction
- [ ] Other
- [ ] Do not know